UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
GENERAL

LOS/PCN/153 (Vol. III)
23 June 1995
ENGLISH
ORIGINAL: ARABIC/CHINESE/
ENGLISH/FRENCH/
RUSSIAN/SPANISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA

REPORT OF THE PREPARATORY COMMISSION UNDER PARAGRAPH 11 OF RESOLUTION 1 ON ALL MATTERS WITHIN ITS MANDATE, EXCEPT AS PROVIDED IN PARAGRAPH 10, FOR PRESENTATION TO THE ASSEMBLY OF THE INTERNATIONAL SEABED AUTHORITY AT ITS FIRST SESSION

VOLUME III

Documents relevant to the implementation of resolution II (General Committee) (except those relating to training)

CONTENTS

Documents relevant to the implementation of resolution II (General Committee) (except those relating to training)

		Page
LOS/PCN/BUR/R.1	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on the application of the Government of the Republic of India for registration as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea	7
LOS/PCN/BUR/R.2	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on the application of the Government of the Republic of France for registration as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea	24
LOS/PCN/BUR/R.3	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the Tribunal for the Law of the Sea on the application of the Government of Japan for registration as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea	51
LOS/PCN/BUR/R.4	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on the application of the Government of the Union of Soviet Socialist Republics for registration as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea	76
LOS/PCN/BUR/R.5	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission .	102
LOS/PCN/BUR/R.5/Corr.1	Corrigendum	119

/...

CONTENTS (continued)

		Page
LOS/PCN/BUR/R.7	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on the application of the Government of the People's Republic of China for registration as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea .	120
LOS/PCN/BUR/R.7/Corr.1	Corrigendum	137
LOS/PCN/BUR/R.8	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on the application of the Governments of the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, the Republic of Poland and the Union of Soviet Socialist Republics for registration of the Interoceanmetal Joint Organization as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea	138
LOS/PCN/BUR/R.10	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea	157
LOS/PCN/BUR/R.10/Add.1	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission forthe International Seabed Authority and for the International Tribunal for the Law of the Sea: Addendum	169
LOS/PCN/BUR/R.11	Periodic report on the activities of India in the pioneer area (Submitted by the delegation of India)	181
LOS/PCN/BUR/R.12	Periodic report on the activities of Deep Ocean Resources Development Co., Ltd. (DORD) in the pioneer area (Submitted by the delegation of Japan)	184
LOS/PCN/BUR/R.12/Corr.1 (English only)	Corrigendum......................................	187

/...

CONTENTS (continued)

		Page
LOS/PCN/BUR/R.13	Periodic report on the activities of IFREMER/AFERNOD in the pioneer area (*Submitted by the delegation of France*)	188
LOS/PCN/BUR/R.14	Periodic report on the activities of Yuzhmorgeologiya in the pioneer area (*Submitted by the delegation of the Russian Federation*)	194
LOS/PCN/BUR/R.14/Corr.1 (A/C/E/F and S only)	*Corrigendum*	195
LOS/PCN/BUR/R.20	Periodic report on the activities of the China Ocean Mineral Resources Research and Development Association (COMRA) in the pioneer area (*Submitted by the delegation of China*)	196
LOS/PCN/BUR/R.21	Explanation of the database diskette for the reserved area of the International Seabed Authority as required of the pioneer investor (*Submitted by the delegation of China*)	199
LOS/PCN/BUR/R.22	Periodic report on the activities of IFREMER/AFERNOD in the pioneer area (*Submitted by the delegation of France*)	201
LOS/PCN/BUR/R.23	Periodic report on the activities of the Deep Ocean Resources Development Co., Ltd. (DORD) in the pioneer area (*Submitted by the delegation of Japan*)	205
LOS/PCN/BUR/R.24	Periodic report on the activities of India in the pioneer area (*Submitted by the delegation of India*)	208
LOS/PCN/BUR/R.25	Periodic report on the activities of Yuzhmorgeologiya in the pioneer area (*Submitted by the delegation of the Russian Federation*)	211
LOS/PCN/BUR/R.30	Periodic report on the activities of the Interoceanmetal Joint Organization (IOM) and its certifying States in the pioneer area from August 1992 to July 1993 (*Submitted by the delegation of Poland*)	217

CONTENTS (continued)

		Page
LOS/PCN/BUR/R.31	Periodic report on the activities of IFREMER/AFERNOD in the pioneer area (1 January-31 December 1993) (Submitted by the delegation of France)	221
LOS/PCN/BUR/R.32	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea	223
LOS/PCN/BUR/R.33	Periodic report on the activities of the China Ocean Mineral Resources Research and Development Association (COMRA) in the pioneer area (Submitted by the delegation of China)	237
LOS/PCN/BUR/R.34	Periodic report on the activities of India in the pioneer area (Submitted by the delegation of India)	240
LOS/PCN/BUR/R.35	Periodic report on the activities of the Deep Ocean Resources Development Co., Ltd. (DORD) in the pioneer area (Submitted by the delegation of Japan)	243
LOS/PCN/BUR/R.38	Proposal by the Russian Federation regarding the decision by the General Committee on the agenda item relating to the consideration of the letters from the coordinator of the group of registered pioneer investors	247
LOS/PCN/BUR/R.39	Periodic report on the activities of the Interoceanmetal Joint Organization (IOM) and its certifying States in the pioneer area from 1 July 1993 to 31 December 1993 (Submitted by the delegation of Poland)	248
LOS/PCN/BUR/R.39/Corr.1	Corrigendum	251
LOS/PCN/BUR/R.40	Report of the Group of Technical Experts to the General Committee of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on the application of the Government of the Republic of Korea for registration as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea	252

/...

CONTENTS (continued)

		Page
LOS/PCN/BUR/R.41	Draft decision of the General Committee Proposal by the Russian Federation	270
LOS/PCN/BUR/R.42	Draft decision of the General Committee Proposal by the Russian Federation	271
LOS/PCN/BUR/R.43	Periodic report on the activities of Yuzhmorgeologiya in the pioneer area over the period 1 January to 1 August 1994 (Submitted by the delegation of the Russian Federation)	273
LOS/PCN/BUR/R.44	Relinquishment of pioneer areas (resolution II, paragraph 1 (e)) (Submitted by the delegation of India)	284
LOS/PCN/BUR/R.45	Relinquishment of pioneer areas (resolution II, paragraph 1 (e)) (Submitted by the delegation of Poland on behalf of the Interoceanmetal Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech Republic, the Republic of Poland, the Russian Federation and the Slovak Republic)	287
LOS/PCN/BUR/R.46	Letter dated 22 July 1994 from the Director General of the Interoceanmetal Joint Organization (IOM), on behalf of the Intergovernmental Council of IOM, addressed to the Chairman of the Preparatory Commission	291
LOS/PCN/BUR/R.49	Summary of the preliminary report on the reserved area for the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea (Prepared by the Interoceanmetal Joint Organization and submitted by the delegation of Poland on behalf of IOM's certifying States) (Supplement to LOS/PCN/BUR/R.46)	292

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.1
10 August 1987

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED
AUTHORITY AND FOR THE
INTERNATIONAL TRIBUNAL FOR
THE LAW OF THE SEA
New York, 27 July-21 August 1987

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEA-BED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF THE REPUBLIC OF INDIA FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

	Paragraphs	Page
Letter of transmittal		8
Introduction	1 - 4	10
I. Basic information regarding the application		11
II. Examination of the technical data and information to determine whether both parts of the application area are of equal estimated commercial value	5 - 32	14
III. Conclusions	33	21

Annexes

	Page
I. List of the membership of the Group of Technical Experts	22
II. List of co-ordinates of Areas A and B (as adjusted)*	

---

* Confidential. Deposited with the Secretary-General.

/...

LETTER OF TRANSMITTAL

7 August 1987

Mr. José Luis Jesús
Chairman of the Preparatory Commission for
the International Sea-Bed Authority and
for the International Tribunal for the
Law of the Sea
New York, New York

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application of the Government of the Republic of India for registration as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts has undertaken an examination of the application in accordance with its mandate and the attached report which was unanimously adopted contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 3 and 7 August 1987 during which period the Group held nine sessions.

We regret that two members of the Group, Mr. Samuel Sona Betah (Cameroon) and Mr. Sulaiman Zuhdi Pane (Indonesia), were unable to attend this meeting. The Group wishes to express its appreciation for the co-operation of the representatives of the applicant, the Government of India.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist on the matter of registration of India. The Group also wishes to draw to your attention the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the Law of the Sea secretariat in providing assistance throughout our meetings.

Yours sincerely,

Signed in New York on 7 August 1987:

Zhang BINGXI
(People's Republic of China)

Alfredo José DA SILVA NETTO
(Brazil)

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)

/...

Knut S. HEIER
(Norway)

Takeshi IZUMI
(Japan)

H. H. E. KAMBAILA
(Republic of Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Luis G. PREVAL PAEZ
(Cuba)

David W. PASHO
(Canada)

Bodo SCHIRMER
(German Democratic Republic)

T. R. P. SINGH
(India)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission of the International Sea-Bed Authority and the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the Statement of Understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1). The Group was mandated to determine whether the applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1) and the statement of understanding of 10 April 1987 (LOS/PCN/L.43/Rev.1) and to submit a report on each application to the General Committee. The Group noted that in case of there being different opinions among its members, such opinions shall be included in the report. 1/

2. In accordance with the relevant decision of the Preparatory Commission, the application of India was examined to ensure whether it was in conformity with resolution II taking into account that "India, like other applicants, if it so wishes, will identify in its application area, an area totalling 52,300 square kilometres for incorporation in the area of up to 150,000 square kilometres to be allocated to it as a pioneer area. The provisions on relinquishment in resolution II, paragraph 1 (e), shall apply to the allocated area." 2/

3. The Group of Technical Experts held its initial meeting on the afternoon of 3 August 1987. The Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya Nandan, briefed the Group on its mandate and outlined the specific procedures that would be in effect to ensure the confidentiality of data and information contained in the application of India.

4. The Group met again on the morning of 4 August 1987, at which time the application submitted by the Government of India was opened in the presence of the representative of the applicant. Mr. M. M. K. Sardana and Mr. Bhimsen Rao, from the delegation of India, introduced the application, which the Group proceeded to examine immediately. Subsequently, the Group met each day in morning and afternoon sessions from 3 to 7 August 1987.

1/ Paragraph 4 of the statement on the implementation of resolution II, contained in the annex to document LOS/PCN/L.41/Rev.1.

2/ Paragraph 13 (3) of the statement on the implementation of resolution II, contained in the annex to document LOS/PCN/L.41/Rev.1.

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the Applicant

1. Name of State(s) or certifying State(s):

The Republic of India

2. Date of Signature of the Convention by the certifying State or States:

10 December 1982

3. Applicant:

a. Name Department of Ocean Development, Government of India

b. Mailing Address
Mahasagar Bhavan, Block -12, C.G.O. Complex
Lodi Road, New Delhi - 110003, India
Telephone: 360874

c. Cable Address 'MAHASAGAR BHAVAN'

Telex Address 316153 DOD-IN

d. Name of Designated Representative or Designated Authority Dr. S. Z. Qasim

e. Mailing Addresses
Mahasagar Bhavan, Block-12, C.G.O. Complex
Lodi Road, New Delhi - 110003, India
Telephone: 360874

f. Cable Address 'MAHASAGAR BHAVAN'

Telex Address 3161535 DOD-IN

/...

4. Status of the Applicant under Resolution II, para.(1)(a)(i):

State ☒

State enterprise ☐

Natural or juridical person ☐

5. Certificate of registration as a juridical person (if applicable)

Submitted: Yes ☐ No ☐

Not Applicable ☒

6. Date of receipt of application: 12 January 1984

7. Date of receipt of revised application: 20 July 1987

B. Data submitted by the Applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Co-ordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances of compliance with the provisions of Resolution II and the Understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1)

Submitted: Yes ☒ No ☐

C. Payment of Fee:

The applicant agrees to pay a fee of $US 250,000 to the Preparatory Commission as soon as certain administrative arrangements have been made for the transfer of such fees.

II. EXAMINATION OF THE TECHNICAL DATA AND INFORMATION TO DETERMINE WHETHER BOTH PARTS OF THE APPLICATION AREA ARE OF EQUAL ESTIMATED COMMERCIAL VALUE

A. Data submitted

5. The application of India identifies a region of 300 thousand square kilometres in the Central Indian Ocean Basin (see figure 1). The area is divided into Areas A and B, covering 150 thousand square kilometres respectively. An area of 52.3 thousand square kilometres was also delineated and identified as Area S for incorporation in the pioneer area to be allocated to the applicant in accordance with paragraph 13 (3) of LOS/PCN/L.41/Rev.1 of 5 September 1986. The areas are approximate within less than 1 per cent margin of error.

6. The following technical documents were included in the application:

(a) Maps:

(i) General map showing important geographic and oceanic features in and around the application area with Areas A, B and S marked on the map;

(ii) Map showing the application area on a scale of 1:1 million (Mercator projection) marking the turning points of Areas A, B and S;

(iii) Map showing the topography of the sea-bed in the application area with contours at 100-metre intervals;

(iv) Map showing nodule abundance (wet kg/m^2) in the application area. This map shows the sampling locations and depicts the average abundance of nodules by symbols;

(v) Map showing locations of sample points for which metal values were determined.

(b) Tables:

Table 1: Co-ordinates of the application area: Geographical co-ordinates of the application area divided into two, namely Area A and Area B and the co-ordinates of Area S have been listed in this table in terms of latitude and longitude;

Table 2: Technical Data Sheet: This table lists the catalogue of values, giving station numbers, co-ordinates of the station, water depths, abundance of nodules (wet kg/m^2) and metal values as percentages of Mn, Co, Ni, and Cu (on dry basis);

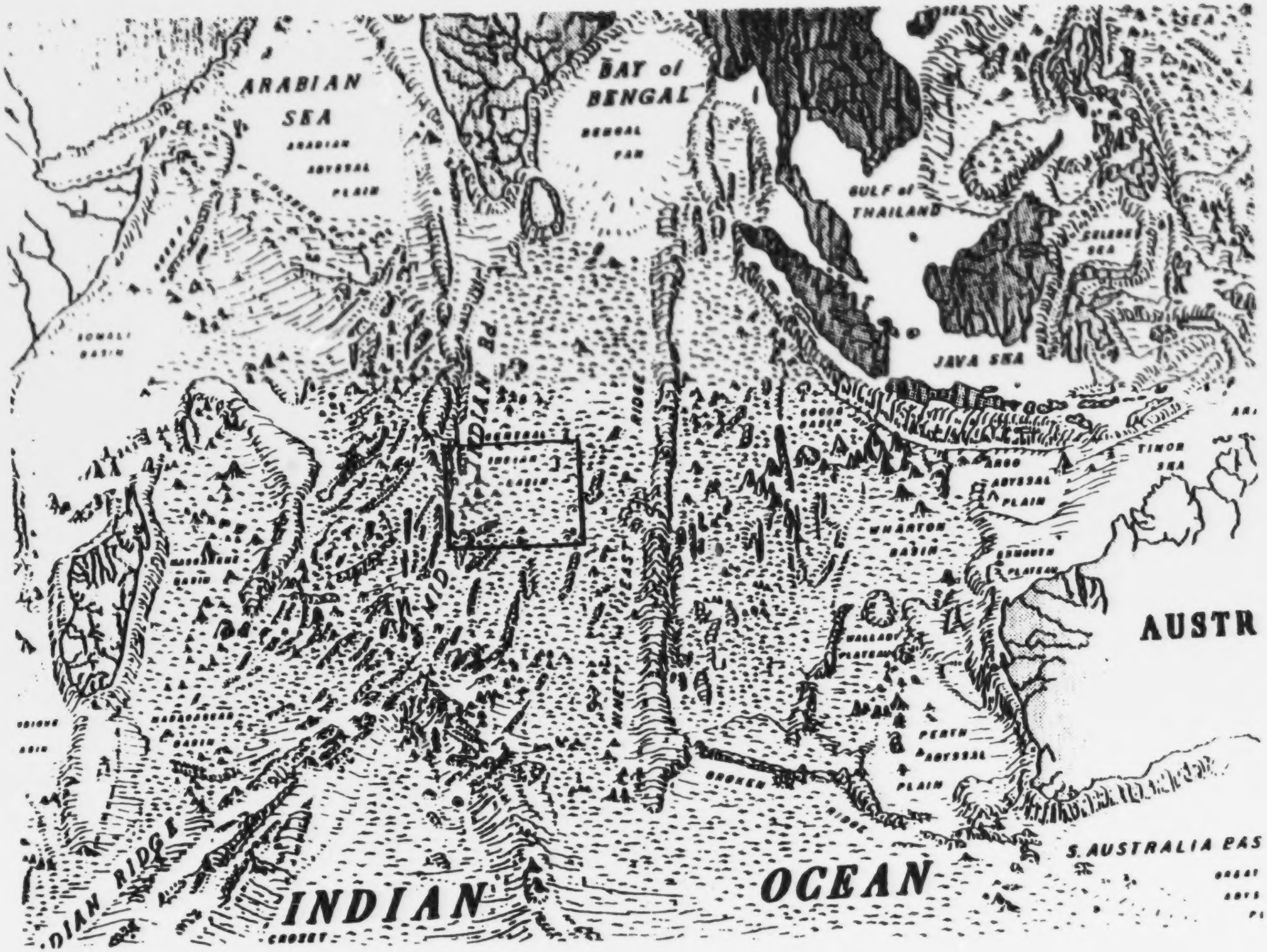


FIGURE 1. Location of the Indian Application Area.

/...

Table 3: Estimated commercial values in terms of tonnages of wet nodules, tonnages of Mn, Co, Ni, and Cu (on dry basis) and the tonnage of equivalent nickel metal for Area A, Area B and Area S;

Table 4: Description of equipment used in survey and exploration. This table gives basic information on navigational, acoustic and sampling equipment as well as the relevant analytical methods.

7. Additional technical details were given by the applicant in response to questions by the members of the Group of Experts.

8. The data in table 3 on the estimated tonnage of nodules and the metals (Mn, Co, Ni and Cu) have been provided with a range of variation at 95 per cent confidence level.

9. All the technical data submitted in the application have been gathered using standard and recognized methods.

B. Methodology

1. General

10. The Group considered using a number of possible indicators that might be useful in assessing that Areas A and B are of equal estimated commercial value. It was recognized that any approach should be based on the fact that the data reflect the prospecting or exploration stage and that they should be based on a relative comparison of the two areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

11. The most important factors were considered to be the metal content, nodule abundance and bathymetry. In the view of the Group, the complex relationship between these factors makes it impossible to make a comparative assessment on the basis of one single composite indicator. It was concluded that several indicators were required in order to ensure comprehensive consideration of the variety of factors that might now, or in the foreseeable future, have a major effect on the relative commercial values of the two areas.

12. The Group, comprising experts in various disciplines, discussed a set of criteria in order to adopt an approach centered essentially on technical aspects.

13. Taking into account the relevant provisions contained in resolution II regarding mapping, sampling, abundance of nodules and their metal content, the Group agreed on a procedure for a thorough examination of each and every factor mentioned above.

14. In order to accomplish this task, the Group divided itself into five teams as follows: the first carried out a comprehensive study of nickel; the second, manganese; the third, cobalt; the fourth, the abundance and tonnage of nodules; and the fifth, an examination of the sea-bed topography.

/...

2. Metal content

15. With respect to metal content, the Group evaluated the relative amounts of nickel, cobalt and manganese metal contained in the nodules from each area. The basic information used to make this comparison was developed by calculating the metal accumulation, taken as the percent metal times the nodule abundance at each of some 400 stations. These values, together with per cent metal, were plotted on charts in order to evaluate the relative distribution and trends in the two areas. This procedure was carried out for each individual metal and used to determine whether one or the other area contained either larger areas of higher grade nodules and/or greater quantity of contained metals.

16. In the case of nickel and manganese, an additional analysis was made of the cumulative frequency distribution of the metal accumulations in Areas A, B and S. This was done in order to assess possible differences that might not be reflected in the data on the mean value of metals in the areas.

3. Abundance

17. Data on abundance was used to calculate the average abundance as well as the total tonnage of nodules in the Areas A, B and S. The cumulative frequency distribution of the abundance was determined in each area to assess possible differences.

4. Bathymetry

18. The examination of geomorphological features of Areas A and B was conducted by comparing several sample sites which, in the experts' opinion, reflect the relief features of each area. Five such sites were selected - two in both Areas A and B and one in Area S. For each of these sample sites, bathymetric cross-sections were prepared to give an idea of the distribution of slope angles and overall configuration of features.

19. In the experts' opinion, the nature of the relationship between relief and nodule density as well as metal content does not allow, at this stage, a comparative evaluation of the two areas, as that would have to be based on comprehensive data covering all three factors. Therefore, the relief in the two areas was compared only from the point of view of possible conditions that might affect exploration and exploitation. The process recognizes the relative nature of these comparisons since the relief data are taken from a general bathymetric chart.

C. Results of the evaluation

1. Adequacy of data

20. The Group reviewed the type, frequency and spatial distribution of the data and concluded that they were adequate for developing information that could be used to assess whether the two areas are of equal estimated commercial value. The data are also adequate to show that both areas have technical characteristics that make them worthy of further exploration in order to delineate possible mine sites. At this stage of prospecting, it is not possible to identify or delineate mineable areas in A or B.

21. The Group was informed that, based on present knowledge, the climatic conditions in both parts of the application area were similar.

2. Metal content

22. The Group carried out an evaluation of nickel, cobalt and manganese in the areas. It was decided not to develop separate information on copper in view of the well-established relationship between copper and nickel that allows the characteristics of copper to be closely approximated by the analysis of nickel.

23. Nickel. In the case of nickel, an evaluation of the mean value of nickel metal accumulation and the statistical distribution of the metal accumulation revealed no significant differences between Areas A and B. Careful consideration of the spatial distribution of metal content and metal accumulation, likewise, suggests no significant difference. Although there was considerable discussion concerning a possibility that there might be a difference between the two areas in terms of regions that might have both high grade and high abundance, a thorough evaluation of the data indicated that there was no significant difference.

24. Manganese. Manganese was considered with respect to per cent metal content and accumulation in Areas A and B. The analysis of the data suggests that Areas A and B are virtually identical.

25. Cobalt. The spatial distribution of cobalt accumulation was found to be generally consistent throughout the application area. The cobalt content of Area B is negligibly higher than that of Area A although the accumulation in both Areas A and B was found to be equivalent. From this evaluation and taking into account the sea floor relief, it can be said that Areas A and B are equivalent in the estimated commercial value for cobalt.

3. Abundance and tonnage

26. The results of the calculation of both tonnage and abundance fall within the ranges given in the application and suggest that Areas A and B are similar as far as these indicators are concerned. This was confirmed by the fact that cumulative distribution of abundance in the two areas shows statistical similarity.

4. Bathymetry

27. The geomorphological analysis of Areas A and B has revealed that, despite some secondary differences in relief between the two areas, the bathymetry is comparable. In both areas it is predominantly smooth. Maximum angles of incline do not exceed 7 degrees, with the exception of only two elevations in Area S where they reach 12 degrees. The general direction of the relief structures is mainly latitudinal, and remains the same in both areas.

28. The Group concluded that the sea-bed topography in Areas A and B is essentially similar.

D. Adjustment of areas

29. The Group proceeded to consider its recommendation on the selection of one of the two parts for reservation for the Authority in view of the conclusion that both Areas A and B have equal estimated commercial value. After review of all factors used in evaluating the areas, it was concluded that none, in view of their close similarity, provided a basis for distinguishing between the two.

30. Having reached that assessment, the Group then took into account the effect of changes that would result from the retention of the area of 52.3 thousand square kilometres, referred to as Area S, which had been identified by the applicant for incorporation in the final pioneer area in accordance with paragraph 13 (3) of LOS/PCN/L.41/Rev.1, Annex. Retention by the applicant of Area S, part of which fell in Area A and part fell in Area B, made it necessary to adjust both original Areas A and B in order to ensure that the final reserved area and the final pioneer area were of equal estimated commercial value. In making this adjustment, the Group again took into consideration the abundance and metal content of the nodule samples from all stations and the bathymetry in the relevant areas.

31. After careful examination of the alternatives for adjusting Areas A and B, and taking into consideration all relevant technical factors and the desirability of maintaining the greatest degree of continuity of the final areas, the Group unanimously agreed to recommend that Area B, as adjusted, should be designated as the reserved area for the Authority and that Area A, as adjusted, should be designated as the pioneer area for allocation to the applicant. Both areas are of 150 thousand square kilometres each.

32. The precise co-ordinates of the adjusted Areas A and B (see figure 2), have been determined by the Group of Technical Experts and are contained in a sealed envelope deposited with the Secretary-General of the United Nations.

/...

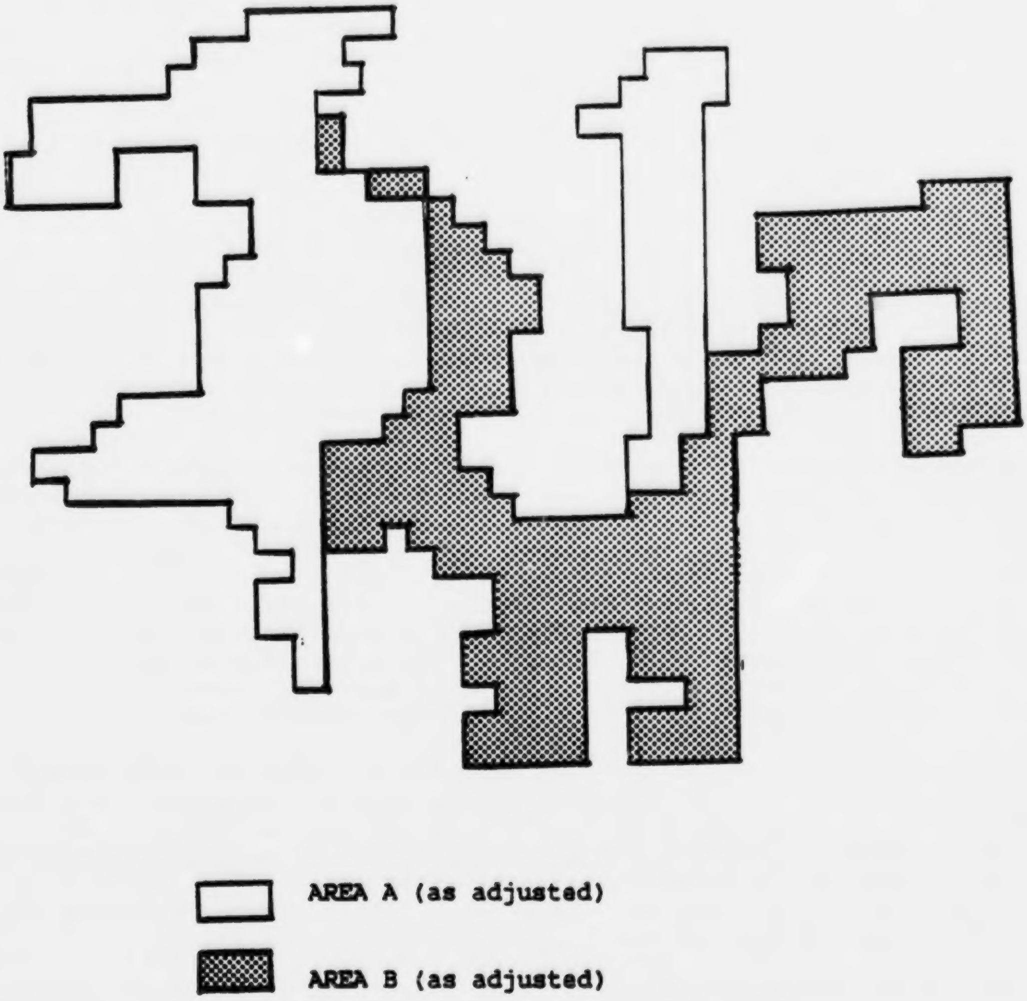


FIGURE 2. Areas A and B (as adjusted).

III. CONCLUSIONS

33. The following conclusions were reached unanimously by the Group.

(a) Having examined the particulars submitted by the applicant which are summarized in part I of the present report, the Group has concluded that the application has been submitted in accordance with resolution II and the understandings contained in documents LOS/PCN/L.41/Rev.1 and LOS/PCN/L.43/Rev.1.

(b) Having evaluated the technical data and information submitted by the applicant as referred to in Part II of the present report and having made the necessary adjustments to the two areas, the Group determined that Areas A and B as adjusted are of equal estimated commercial value.

(c) As regards the designation of the reserved area and the allocation of the pioneer area, the Group agreed to recommend for the consideration of the General Committee:

(i) That Area B, as adjusted, should be designated as the reserved area, and

(ii) That Area A, as adjusted, which includes an area of 52.3 thousand square kilometres identified by the applicant, should be designated as the pioneer area to be allocated to the applicant.

Annex I

LIST OF THE MEMBERSHIP OF THE GROUP OF TECHNICAL EXPERTS

1. Mr. Samuel Sona Betah
Deputy Director of Geology
Ministry of Mines and Power
Yaoundé, Cameroon

2. Dr. Zhang Bingxi
Senior Chief Engineer
Department of Science and Technology
Ministry of Geology and Mineral Resources
Beijing, China

3. Dr. Alfredo José da Silva Netto
Assistant to the Directorate for Exploration and
  Production, PETROBRAS
Avenida República do Chile, 65
23 Andar
Rio de Janeiro, RJ 20035
Brazil

4. Dr. Igor Sergeevich Gramberg
Director-General of the Northern Production
  Combine for Marine Geological Exploration
  Work (SEVMORGEOLOGIA)
Ministry of Geology of the USSR
Moscow, USSR

5. Mr. Knut S. Heier
Managing Director
Norwegian Geological Survey
Leiv Eirikssons v. 39
7000 Trondheim
Norway

6. Mr. Takeshi Izumi
Director-General, Overseas Activities
Metal Mining Agency of Japan
Tokiwa Building,
1-24-14, Toranomon, Minato-ku
Tokyo, Japan

7. Mr. H. H. E. Kambaila
Chief Inspector of Mines
Mines Safety Department
P.O. Box 21006
Kitwe, Republic of Zambia

/...

8. Mr. Naphtali Ndiritu Kamundia
Geologist, Government of Kenya
Nairobi, Kenya

9. M. Jean-Pierre Lenoble
Institut français de recherche pour l'exploitation
de la mer (IFREMER)
Chef du département de coopération internationale,
Chargé de Mission "Nodules polymétalliques" auprès
du Président Directeur Général
Paris, France

10. Dr. Alfonso López-Reina
Director of the Colombian Mining Institute,
INGEOMINAS
Carrera 53 N° 105-76
Bogotá, Colombia

11. Mr. Sulaiman Zuhdi Pane
General Manager, Joint Operating Body (JOB)
Pertamina-Japex North Sumatra Ltd.
Skyline Building, 19th Floor
Jakarta, Indonesia

12. Ing. Luis G. Preval Paez
Principal Specialist of the Production, Investments
and Metallurgical Mining Development Division of
the Ministry of Basic Industry
Havana, Cuba

13. Mr. David W. Pasho
Director, Ocean Mining Division
Mineral Policy Sector
Department of Energy, Mines and Resources
Ottawa, Canada

14. Dr. Bodo Schirmer
Special Representative of the Minister of Geology
Central Geological Institute
c/o Ministry of Foreign Affairs
Berlin, German Democratic Republic

15. Dr. T. R. P. Singh
Senior Manager, Engineers India Ltd.
R. K. Puram
New Delhi 110066
India

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.2
4 December 1987

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEA-BED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF THE REPUBLIC OF FRANCE FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

		Paragraphs	Page
LETTER OF TRANSMITTAL			26
INTRODUCTION		1 - 6	28
I.	Basic information regarding the application	7 - 11	31
II.	Examination of information and technical data submitted by the applicant	12 - 27	38
III.	Determination of equal estimated commercial value for the area recommended to be reserved for the Authority and the area recommended to be allocated to the applicant	28 - 54	41
IV.	Determination of equal estimated commercial value of areas referred to in LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (c) and (d)	55 - 60	46
V.	Recommendations	61	48

/...

CONTENTS (continued)

Page

Annexes

I. List of members of the Group of Technical Experts 49

II. List of co-ordinates*

---

* Confidential. Deposited with the Secretary-General.

LETTER OF TRANSMITTAL

4 December 1987

Mr. José Luis Jesus
Chairman of the Preparatory Commission for
the International Sea-Bed Authority and
for the International Tribunal for the
Law of the Sea
New York, New York

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application of the Government of the Republic of France, on behalf of Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) - Association Française d'Etudes et de Recherche des Nodules (AFERNOD) - for registration as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts has undertaken an examination of the application in accordance with its mandate, and the attached report which was unanimously adopted contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 23 November and 4 December 1987, during which period the Group held 22 sessions.

The Group wishes to express its appreciation for the co-operation of the representatives of the applicant, IFREMER/AFERNOD, and the Government of France.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist on the matter of registration of France. The Group also wishes to draw to your attention the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the Law of the Sea secretariat in providing assistance throughout our meetings.

Yours sincerely,

Signed in New York on 4 December 1987:

Samuel SONA BETAH
(Cameroon)

ZHANG Bingxi
(China)

/...

Alfredo José DA SILVA NETTO
(Brazil)

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)

Knut S. HEIER
(Norway)

Takeshi IZUMI
(Japan)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

Luis G. PREVAL PAEZ
(Cuba)

David W. PASHO
(Canada)

Bodo SCHIRMER
(German Democratic Republic)

T. R. P. SINGH
(India)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission of the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the Statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was mandated to determine whether the applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the Statement of understanding of 5 September 1986 and the Statement of understanding of 10 April 1987 (LOS/PCN/L.43/Rev.1) and to submit a report on each application to the General Committee. The Group noted that, in case of there being different opinions among its members, such opinions shall be included in the report (LOS/PCN/L.41/Rev.1, annex, para. 4).

2. In accordance with the relevant decision of the Preparatory Commission, the application of France, on behalf of Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) - Association Française d'Etudes et de Recherche des Nodules (AFERNOD) - was examined to ensure whether it was in conformity with resolution II, taking into account:

(a) That applicants who do not have practical problems and do not make voluntary advance relinquishments of areas shall be deemed to have complied with the requirements for relinquishment under resolution II, paragraph 1 (e), upon registration, provided that the total pioneer area allocated to them does not exceed 75,000 sq km (see LOS/PCN/L.41/Rev.1, annex, para. 10); and

(b) That "applicants with overlapping claims, namely France, Japan and the Union of Soviet Socialist Republics, shall contribute portions of areas in the north-east Pacific Ocean covered by their respective revised applications that will constitute part of the area to be reserved for the Authority. The areas so contributed may be incorporated in any area for which the Enterprise may wish to submit a plan of work, and together they shall be of equal estimated commercial value to at least the average estimated commercial value of the three areas of up to 52,300 sq km to be allocated to the pioneer investors" pursuant to subparagraph (d) of this paragraph;

(c) "The contributions to be made by the three applicants for this purpose shall be as follows:

(i) France - an area totalling 20,000 sq km adjacent to its presently overlapping area with the Soviet Union;

(ii) Japan - an area totalling 17,300 sq km adjacent to its presently overlapping area with the Soviet Union;

/...

(iii) Soviet Union - an area totalling 15,000 sq km 14,549 sq km of which will be from within its presently overlapping areas with France and with Japan and 451 sq km which it obtains from France following adjustment of claims between the two applicants;"

(d) "The total area to be allocated to each applicant shall not exceed 75,000 sq km after any relinquishment of areas referred to in paragraphs 9, 10 and 11 has been made. For the purpose of allocation, each applicant may indicate in its application portions of its application area up to a limit of 52,300 sq km that shall form part of the total area to be allocated to it by the Commission. In addition to the areas indicated by the applicants, the Commission shall allocate, in accordance with resolution II, paragraph 3, an area from their respective application areas necessary to complete the total area to be allocated to each applicant" (see LOS/PCN/L.41/Rev.1, annex, para. 13 (1) (c) and (d) and (2)).

3. The Group of Technical Experts commenced its work on the morning of 23 November 1987. The Special Representative briefed the Group on its mandate and outlined the specific procedures that were in effect to ensure the confidentiality of data and information contained in the applications for registration before the Group.

4. The Group met again in the afternoon of 23 November 1987, at which time the Chairman of the Preparatory Commission, Mr. José Luis Jesus, addressed the Group. The Group then began its consideration of the three applications before it, beginning with the application of France.

5. The Group structured its work as follows:

(a) Stage I would involve:

(i) A preliminary examination of all technical data that was submitted for the application area;

(ii) A more detailed evaluation of data in the sectors where the Group will make recommendations to the General Committee concerning which sectors should be reserved for the Authority;

(iii) A tentative recommendation as to which sectors should be reserved for the Authority;

(b) For Stage II the Group felt it should have the benefit of technical data in those sectors from other applications that are adjacent to sectors in the French application. After taking this information into account, the Group:

(i) Made a final recommendation concerning which sectors should be reserved for the Authority. The results are to be outlined in part III of the Group's report;

/...

(ii) Determined whether the total area recommended for reservation by the Authority is of equal estimated commercial value to the area allocated to the applicant (LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (b)). The results are to be outlined in part III C of the Group's report;

(c) Stage III involved a comparison of the average estimated commercial value of the three areas identified by the respective applicants to be allocated to each applicant by the Commission (LOS/PCN/L.41/Rev.1, annex, paragraph 13 (2)), with the estimated commercial value of the total area composed of the contributions made by the applicants pursuant to LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (d). On the basis of this evaluation the Group would advise the General Committee whether or not the estimated commercial value of the contributed areas reserved for the Authority is equal to at least the average estimated commercial value of the three areas identified by the applicants for incorporation into the respective areas to be allocated to them. The results are to be presented in part IV of the Group's report.

6. The Group completed its work in the afternoon of 5 December 1987. In view of the large volume of work involved in processing and analysing the three applications, the Group had to work for long hours each day, including a public holiday and the weekends. During the entire period of work, the Secretariat provided all necessary facilities and assistance.

/...

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the Applicant

1. Name of of State(s) or certifying State(s):

France

2. Date of Signature of the Convention by the certifying State or States:

10 December 1982

3. Applicant:

a. Name: Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) on behalf of Association Française d'Etudes et de Recherche des Nodules (AFERNOD)

b. Mailing Address:
66 Avenue d'Iéna
75116 Paris
France

c. Telephone Number: 1-47235528
Telex Address: 610775

d. Name of Designated Representative or Designated Authority: Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER)

e. Mailing Addresses:
66 Avenue d'Iena
75116 Paris, France
Telephone Number: 1-47235528

f. Telex Address: 610775

/...

4. Status of the Applicant under resolution II, paragraph (1) (a) (i):

State ☐

State enterprise ☒

Natural or juridical person ☐

5. Certificate of registration as a juridical person (if applicable):

Submitted: Yes ☐ No ☐

Not Applicable ☒

6. Date of receipt of application: 22 August 1984

7. Date of receipt of revised application: 15 November 1987

/...

B. Data submitted by the Applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Co-ordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances that the application area is located beyond the limits of national jurisdiction of any State

Submitted: Yes ☒ No ☐

6. Assurances of compliance with the provisions of resolution II and the Statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1)

Submitted: Yes ☒ No ☐

C. Payment of Fee:

The applicant states that it will pay the fee of US $250,000 to the Preparatory Commission as soon as certain administrative arrangements have been made for the transfer of such fees.

/...

D. The application area and its division between the reserved area and the allocated area

7. The application area of France covers a total of approximately 230,440 sq km in the Clarion-Clipperton Zone of the Pacific Ocean. This area is distributed over two regions of 72,650 sq km and 157,790 sq km respectively. The first region is located in the portion of the Clarion-Clipperton Zone which is referred to as the "central" region, and the other in the "western" region (see table 1 and figures 1 and 2).

8. In accordance with paragraph 13 (2) of the annex to document LOS/PCN/L.41/Rev.1, the applicant has identified an area of 52,290 sq km for incorporation in the total area of 75,000 sq km to be allocated to it, in accordance with paragraph 10 of that document. This area consists of two segments: one of 43,960 sq km in the central region (F_1) and the other of 8,330 sq km in the western region (F_2). In order to make up the 75,000 sq km to be allocated to the applicant, the applicant further identified two areas of approximately 22,700 sq km each in accordance with resolution II, paragraph 3. Each of these two areas consists of two segments. These segments are:

B_1	(4,960 sq km) in the central region
B_2	(3,550 sq km) in the central region
C_1	(22,350 sq km) in the western region
C_2	(18,980 sq km) in the western region

9. The total area to be reserved for the Authority will then consist of one of the two areas of 22,700 sq km, the area of 20,180 sq km (A_1 in the central region) contributed by the applicant in accordance with paragraph 13 (1) (c) and (d) of the annex to LOS/PCN/L.41/Rev.1 and the remainder of the application area consisting of 108,130 sq km (A_2). Thus the total area to be reserved for the Authority will be 155,420 sq km.

Table 1. Disposition of sectors in the Application of France

(in square kilometres)

	Western region	Central region	Subtotal
Area identified by applicant for incorporation in the Area to be allocated to it	F_2 - 8 330	F_1 - 43 960	
			52 290
Selection from two areas of 22,700 sq km each in accordance with paragraph 13 (2)*			
C_1 or C_2	C_1 - 22 350	B_1 - 4 960	
and	or	or	
B_1 or B_2	C_2 - 18 980	B_2 - 3 550	
			49 840
Remaining area for incorporation in the reserved Area	A_2 - 108 130		
			108 130
Area to be contributed by the applicant in accordance with paragraph 13 (1) (c) and (d)*		A_1 - 20 180	
			20 180
Total	157 790	72 650	230 440

---

* References are to document LOS/PCN/41/Rev.1, annex.

/...

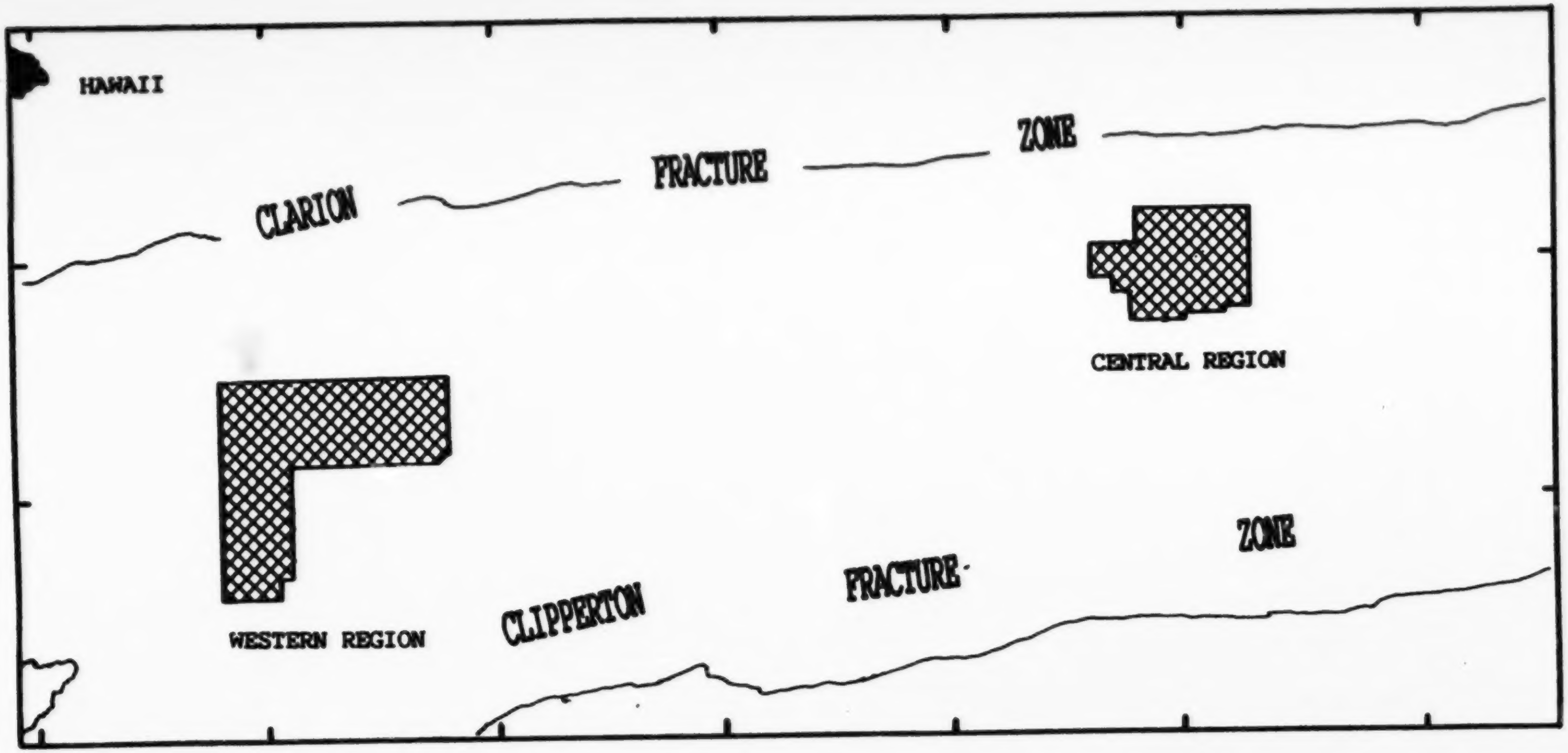


Figure 1. General location of the French application areas in the Pacific Ocean.

/...

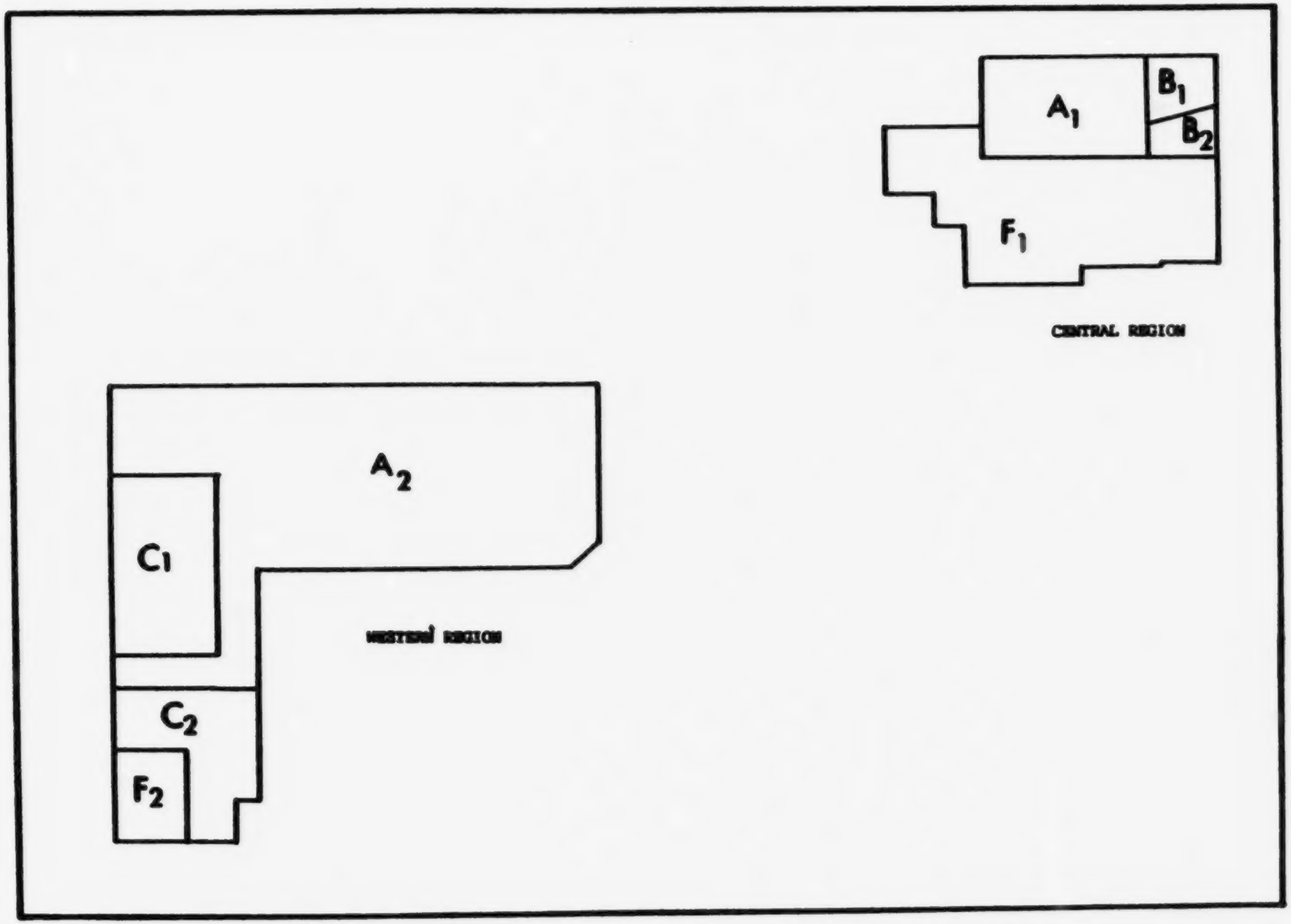


Figure 2. Disposition of sectors in the application of France.

/...

E. Overlaps and identification of contributed areas

10. In order to confirm that there were no overlaps among the French, Japanese and Soviet application areas, all co-ordinates were plotted on a base map at a scale of 1:5,000,000. Common boundaries between application areas were examined graphically and by checking the individual co-ordinates. It was concluded that there were no overlaps among the areas applied for.

11. At the time applicants made their general introductory presentation to the Group, each applicant, in the presence of other applicants, identified the sector to be contributed by it to the Authority in the central region.

II. EXAMINATION OF INFORMATION AND TECHNICAL DATA SUBMITTED BY THE APPLICANT

A. Information and data submitted

12. The following technical documents were submitted in the application:

(a) Statements containing basic information related to the applicant, certification of the level of expenditure and assurances regarding the absence of overlapping areas;

(b) The primary document entitled "Application submitted by France for registration as a pioneer investor" (original in French with unofficial English translation) including sections on:

(i) Identity of the applicant;

(ii) Delineation of the area covered by the French application;

(iii) Method used to estimate the commercial value of the sectors;

(iv) Proposed division of the French application area;

(v) Means of exploration used;

(vi) Characteristics of the French application area;

(vii) Development prospects;

(b) Appendices containing:

(i) Catalogue of data collected for each sector;

(ii) Technical data on navigation, sampling and acoustic equipment;

/...

(c) The maps marked as follows:

(i) General map showing position of eastern and western zones; 1/

(ii) General map showing position of the different sectors;

(iii) Eastern zone: general map of nodule sampling localities;

(iv) Eastern zone: general map of nodule sampling localities and nodule abundance;

(v) Eastern zone: overall map of bathymetric data acquired with wide beam echosounder;

(vi) Eastern zone: simplified overall map of bathymetric data acquired with "Sea Beam" multibeam echosounder;

(vii) Eastern zone: example of detailed bathymetric relief map made with "Sea Beam" multibeam echosounder;

(viii) Western zone: general map of nodule sampling localities;

(ix) Western zone: general map of nodule sampling localities and nodule abundance.

13. The applicant's representatives also provided supplementary tables containing:

(a) A listing of sample group locations and data on metal concentration for each portion of the area covered in the application area;

(b) A numerical listing of the number of sample points that fall within various ranges of metal concentration for each portion of the area covered in the application area.

14. The representatives of the applicant provided clarifications as required on information and technical data submitted.

15. It was noted that all technical data submitted in the application have been gathered using standard and recognized methods.

B. Methodology

1. General

16. The Group reviewed the methodology used to evaluate the application of India and concluded that similar methodology should be used to evaluate the application of France. The Group considered using a number of possible indicators that might be useful in assessing equal estimated commercial values of areas. It was recognized that any approach should be based on the fact that the data reflect the

/...

prospecting or exploration stage and that it should be based on a relative comparison of the areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

17. As in the case of India, the most important factors to be considered were the metal content, nodule abundance, bathymetry and geomorphology. Because the central and western regions are separated by some distance, possible differences in weather conditions that could affect exploration and mining operations were also considered.

18. The French application provides data on 122 locations in the 230,440 sq km application area. Each location is described as a cluster of 1 to 7 (average 4) stations where photographs of the bottom and nodule sample were obtained. The distribution of the locations is variable. In the western region the distance between locations varies from 20 to 60 km, while it varies from 10 to 30 km in the central region. The applicant stated that these variations were the result of the changes that occurred in the course of resolution of conflicts with respect to overlapping claims.

2. Abundance of nodules

19. Data on average abundance and nodule tonnage supplied in the application was checked for arithmetic accuracy. Total tonnage and the average tonnage per sq km was used for comparing various sectors and areas. The geographical distribution of abundance in the different areas was reviewed on maps provided by the applicant and analysed in order to determine whether areas being evaluated contained sectors of higher abundance.

3. Metal content

20. With respect to metal content, the Group evaluated the relative amounts of nickel, cobalt and manganese contained in the nodules for the sectors being considered. The basic information used to make these comparisons was provided by the applicant as the tonnage of each metal contained in the nodules per sq km at each location. The evaluations were checked for arithmetic accuracy. It was decided not to develop separate information on copper, except in specific cases, in view of the well-established relationship between copper and nickel that allows the characteristics of copper to be closely approximated by the analysis of nickel.

21. Metal accumulation, together with per cent metal, was plotted on charts in order to evaluate the relative distribution and trends in the various sectors. This procedure was carried out for each individual metal and used to determine whether areas and sectors being evaluated contained larger areas of higher-grade nodules and/or greater quantity of contained metals.

22. As appropriate, cumulative frequency distributions of the metal accumulations in the various sectors were developed in order to allow the Group to make more detailed comparisons.

/...

4. Bathymetry and geomorphology

23. The examination of bathymetric features in all sectors of the application area was carried out by checking and comparing all maps and information provided by the applicant. The nature of the data available at the prospecting stage only allows the possibility of a regional comparison of the sectors.

24. Consideration was taken of the very detailed bathymetric mapping information provided in one portion of Sector F_1. While this type of data was not available for other sectors of the application area, it did help the Group assess the limitations of the generally available bathymetric maps. It reinforced the Group's approach that involved a general consideration of the types of bathymetric features found in the various sectors and their slope angles, size, frequency and distribution.

5. Other data

25. In addition to the above data, the applicant provided a description of the characteristics of its application area concerning the geology, the bottom morphology, the distribution of topographical obstacles as well as the nodules in quantity and quality on the bottom.

26. Complementary information was also given on the methods that could be considered for the mining and processing of the nodules.

27. This information was considered by the experts as valuable for a better understanding of the nature of the possible ore deposits.

III. DETERMINATION OF EQUAL ESTIMATED COMMERCIAL VALUE FOR THE AREA RECOMMENDED TO BE RESERVED FOR THE AUTHORITY AND THE AREA RECOMMENDED TO BE ALLOCATED TO THE APPLICANT

A. General description

1. General features

28. All the selected sectors of the applicant are situated in a structural zone striking WSW-ENE. The zone is located between the Clarion Fracture Zone to the north and the Clipperton Fracture Zone to the south. It is an exceptional zone from the standpoint of the metal content and the high abundance of polymetallic nodule deposits and their quality. This possibly results from favourable tectonic and geological conditions that largely control the process of formation of the nodules.

29. This zone contains deposits that are more attractive as compared with deposits in regions outside the zone.

/...

30. The WSW-ENE striking structural zone is considered to be a tectonic element of the first order. Second-order tectonic elements such as abyssal hills and valleys with relief up to 200 m and volcanic structures with relief that may exceed 600 m are superimposed.

2. Abundance of nodules

31. The data provided by the applicant show high differences in the abundance values from one sample location to another. However, it emerges from the information provided by the applicant that these variations can occur on a much smaller distance of approximately 100 metres. It is consequently rather irrelevant to extend the value of each sample location to the surrounding area, even if the given data is already an average of several stations.

32. Consequently only the averaging of the measurement made in areas large enough to contain a large number of data will give a reliable result.

33. In the western region the abundance is more variable and its average is lower than in the central region.

3. Metal content

34. Nickel. Nickel grades are generally high throughout all the sectors of the application area, with the possible exception in the north-western parts. Areas of high nickel accumulation where both high grade and abundance coincide were scattered throughout the application area.

35. Cobalt. The spatial distribution of cobalt accumulation was found to be consistent with the greater part of the central region of the application area. The values in the south-western part of the central region appeared relatively higher. In the western region, the study of spatial distribution of these values was difficult on account of relatively widely spaced samples. However, better distribution of sampling locations in the southern and central portions of the western region led to the conclusion that the spatial distribution of the accumulation in the two portions was comparable.

36. Manganese. The pattern of distribution of manganese accumulations followed the trend of nickel accumulations, and similar conclusions were drawn.

4. Bathymetry and geomorphology

37. The bathymetric and geomorphological analyses of the areas have revealed that, despite some differences in the relief and frequency of secondary features, the bathymetry and geomorphology are comparable in the total application area. The sea-bottom in the application area is slightly hilly and characterized by irregularly distributed volcanic structures.

/...

38. In general, slopes do not exceed 8°, except for volcanic structures, where slopes may reach 10° or more. The general direction of the second order structures is mainly NNW-SSE and N-S in the central region and E-W in the western region.

39. The Group concluded that when all factors are considered the sea-bottom topography in the areas is essentially similar.

B. Selection of additional areas for allocation

1. Abundance of nodules

40. The average tonnage and abundance data for Sectors B_1 and B_2 and C_1 and C_2 do not show substantial differences between the sectors. Variations in the possible minimum and maximum tonnages do not favour any specific sector and are highly uncertain because of the sparsity of sample locations.

2. Metal content

41. Nickel. The spatial and statistical distribution of rickel accumulation indicate the potential for larger areas with higher values in sectors B_2 and C_1.

42. Cobalt. The spatial distribution of cobalt accumulation in the central region is reasonably consistent with the exception of higher values in Sector C_2. Although the nature of the distribution of sample location in the central region makes it difficult to generalize, there do not appear to be major differences between the sectors.

43. Manganese. The statistical distribution of manganese accumulation relative to two selected reference levels indicates the potential for larger areas with higher manganese values in Sectors B_2 and C_1.

3. Bathymetry and geomorphology

44. The topography in Sectors B_1 and B_2 is characterized by N-S, in Sectors C_1 and C_2 by NNW-SSE trending abyssal hills and valleys that are bounded by relatively steep side-slopes that may correspond to faults. The sectors contain sea mounts, or underwater volcanoes, that may be on the order of 10 km in diameter and have side-slopes higher than 10° in some parts.

45. In a comparison of Sectors B_1 and B_2 and C_1 and C_2 of the application areas, the Group was unable to identify, based on given data, any significant differences in regional structure, types and distribution of features, slopes or relief. The Group concluded that there are no significant differences between any of the sectors contained in the application area.

/...

4. Other factors

46. In addition to the previously noted factors, the Group also took into account the following:

(a) Sector B_2 contains more sample locations than Sector B_1;

(b) Sector C_1, when considered in conjunction with Sectors A_2 in this application and the Sector SA_1 and the Sector AT_2 in the Japanese application area, suggests a coherent trend of higher nickel that extends into Sector C_1 but not C_2;

(c) Since there is little data in Sectors B_1 and B_2 and there is, in general, a tendency for metal-grade nickel to increase from the northern to the central part of the Clarion-Clipperton Zone, Sector B_2 may be more favourable than B_1 on theoretical grounds;

(d) Sectors C_1 and C_2 and Sectors B_1 and B_2 are, respectively, located adjacent to each other and show no difference in regional depth nor would significant differences in weather condition be anticipated.

5. Conclusion

47. The Group decided to recommend for the consideration of the General Committee that Sectors C_1 and B_2 should be selected for incorporation into the area to be reserved for the Authority and Sectors C_2 and B_1 should be selected for incorporation into the area to be allocated to the applicant.

C. Evaluation of equal estimated commercial values of the total area to be reserved for the Authority and the total area to be allocated to the applicant

1. Criterion of size

48. With the recommendation of the additional area proposed for selection by the Group, the area that will be selected in accordance with LOS/PCN/L.41/Rev.1, annex, paragraph 13 (2), in addition to the 52,290 sq km area identified by the applicant to be allocated to it will be as follows:

In the central region	B_1	4 960 sq km
In the western region	C_2	18 980
Total		23 940 sq km

49. As the total area exceeds the permissible area of 75,000 sq km by 1,230 sq km, the applicant proposed to modify marginally the northern boundary of sector C_2 to meet this requirement.

/...

50. As a result, sector C_2 so modified will be reduced to 17,750 sq km and sector A_2 will be increased to 109 360 sq km. With these changes the criterion of size has been met.

51. With the recommendation of the additional area proposed for selection by the Group and the above adjustments, the area to be reserved for the Authority would comprise:

(a) Sector A_1 in the central region to be contributed by the applicant in accordance with paragraph 13 (1) (c) and (d) 2/	20 180 sq km
(b) The additional areas selected in accordance with paragraph 13 (2):	
Sector B_2 in the central region	3 550
Sector C_1 in the western region	22 350
(c) The remaining sector A_2 in the western region	109 360
The total area will be	155 440 sq km

52. The area to be allocated to the applicant would comprise:

(a) The areas identified by the applicant for incorporation in the area to be allocated to it:	
Sector F_1 in the central region	43 960 sq km
Sector F_2 in the western region	8 330
With a subtotal of	52 290 sq km
(b) The sectors selected in accordance with paragraph 13 (2)	
Sector B_1 in the central region	4 960 sq km
Sector C_2 in the western region	17 750
With a subtotal of	22 710 sq km
The total area to be allocated will be	75 000 sq km

/...

2. Evaluation of results

53. The results of all analyses carried out for the areas proposed to be reserved for the Authority and the areas proposed to be allocated to the applicant reveal the following:

(a) The area to be reserved for the Authority is much larger than the area to be allocated to the applicant. This offers more opportunities to the Authority of finding potential mine sites in the reserved area, taking also into account that it lies in the Clarion-Clipperton Zone known to have favourable geological and ore-controlling environments;

(b) The estimated total tonnages of the nodules and the metals are much higher in the area proposed to be reserved for the Authority due to its size than those proposed to be allocated to the applicant;

(c) The area containing higher abundance and metal grades relevant for future mining estimated statistically in the area to be reserved for the Authority as well as in the area to be allocated to the applicant is comparable;

(d) The geographical distribution of the areas containing high values appear more dispersed in the case of the area proposed to be reserved for the Authority than in the area proposed to be allocated to the applicant;

(e) The bathymetric and geomorphological features in the two areas are essentially similar.

3. Conclusion

54. Based on the results of investigations and analysis of the data available at the present level of prospecting and exploration for polymetallic nodules, the Group was of the view that both the areas offer similar potentials in terms of finding competitive mine sites in the respective areas. Accordingly, the estimated commercial value of the area proposed to be reserved for the Authority may thus be considered equal to the estimated commercial value of the area proposed to be allocated to the applicant.

IV. DETERMINATION OF EQUAL ESTIMATED COMMERCIAL VALUE OF AREAS REFERRED TO IN LOS/PCN/L.41/Rev.1, ANNEX, PARAGRAPH 13 (1) (c) AND (d)

1. Adequacy of data

55. The Group considered that the data provided in the applications of France, Japan and the Soviet Union were sufficient to compare the estimated commercial value of the areas formed by the contributions made by each of the three applicants with the average of the estimated commercial values of the areas identified by each applicant for incorporation into their respective allocated areas.

/...

2. Criteria of size and location of the areas

56. The areas contributed by each applicant to the area to be reserved for the Authority under LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (c) and (d) meet the criteria for size and are located in the north-east Pacific Ocean referred to in this report as the "central region". The areas identified by each applicant for incorporation into the respective allocated areas amount to and do not exceed the limit of 52,300 sq km for each applicant.

57. The areas contributed by the applicants and areas identified by them are as follows:

	Areas identified for incorporation into the allocated areas (sq km)		Contributed areas (sq km)	
Applicant	Actual	Criteria	Actual	Criteria
France	52 290	52 300	20 180	20 000
Japan	52 300	52 300	17 300	17 300
Soviet Union	52 300	52 300	15 000	15 000

3. Results of evaluation

58. The results of various analyses made by the Group indicated that the combination of contributed areas were similar to the average of the three identified areas in respect of bathymetry. In respect of the average in situ tonnage of wet nodules, the average of the three identified areas was higher than the combination of contributed areas by 1 per cent. In respect of average manganese, nickel and copper metal tonnages in situ, the difference between the combined contributed areas and the average of the three identified areas was in the range of 6-8 per cent in favour of the identified areas, while for cobalt the difference was about 3 per cent in favour of the combination of contributed areas. These differences may be viewed in the context of the estimation error of about 30 per cent, which is normal at this level of prospecting and exploration. It was further noted that the range of calculated tonnages for nodules as well as the metals were comparable particularly with respect to their upper limits.

59. The Group also noted that with the data available at this level of prospecting and exploration and with the attendant uncertainty in the estimates, the differences in in situ resources of the above magnitude were within the range of estimation errors in such situations. With the present level of knowledge, therefore, it emerges that the areas contributed by the applicants to be reserved for the Authority provide it with a fair and reasonable opportunity to find and develop a mine site that could be competitive with the mine sites that may be found in the areas identified by each applicant.

/...

4. Conclusion

60. In view of the above considerations, the Group concluded that the estimated commercial value of the combination of the contributed areas may be considered to be equal to the average of the estimated commercial value of the areas identified by each of the three applicants.

V. RECOMMENDATIONS

61. The following conclusions were reached unanimously by the Group.

(a) Having examined the particulars submitted by the applicant which are summarized in part I of the present report, the Group has concluded that the application has been submitted in accordance with resolution II and the understandings contained in documents LOS/PCN/L.41/Rev.1 and LOS/PCN/L.43/Rev.1.

(b) As regards the designation of the reserved area and the allocation of the pioneer area, the Group, in the light of the conclusions reached in the present report, agreed to recommend for the consideration of the General Committee:

(i) That the area consisting of Sector A_1 (20,180 sq km in the central region), Sector B_2 (3,550 sq km in the central region), Sector C_1 (22,350 sq km in the western region), and Sector A_2 (109,360 sq km in the western region) with a total of 155,440 sq km should be designated as the reserved area;

(ii) That the area consisting of Sector F_1 (43,960 sq km in the central region), Sector F_2 (8,330 sq km in the western region), Sector B_1 (4,960 sq km in the central region) and Sector C_2 (17,750 sq km in the western region) with a total of 75,000 sq km should be designated as the pioneer area to be allocated to the applicant.

Notes

1/ Referred to elsewhere in this report as central and western regions respectively.

2/ The paragraphs referred to are in document LOS/PCN/L.41/Rev.1, annex.

/...

Annex I

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

1. Mr. Samuel Sona Betah
   Sub-Director of Geology
   Ministry of Mines and Power
   Yaoundé, Cameroon

2. Dr. Zhang Bingxi
   Chairman, Advisory Committee for Science and Technology
   Ministry of Geology and Mineral Resources
   Beijing 100812, People's Republic of China

3. Dr. Alfredo José da Silva Netto
   Assistant to the Directorate for Exploration and Production
   PETROBRAS
   Avenida República do Chile, 65, 23 Andar
   Rio de Janeiro, RJ 20035
   Brazil

4. Dr. Igor Sergeevich Gramberg
   Director, Institute of Geology and Mineral Resources
     of the World's Oceans
   Ministry of Geology of the USSR
   Moscow, USSR

5. Dr. Knut S. Heier
   Director
   Geological Survey of Norway
   Leiv Eirikssons v. 39
   PO Box 3006 Lade
   N-7002 Trondheim
   Norway

6. Mr. Takeshi Izumi
   Director General
   Overseas Activities Department
   Metal Mining Agency of Japan
   Tokiwa Building,
   1-24-14, Toranomon, Minato-ku
   Tokyo, Japan

7. Mr. Hicuunga H. E. Kambaila
   Chief Inspector of Mines
   Mines Safety Department
   P.O. Box 21006
   Kitwe, Republic of Zambia

/...

8. Mr. Naphtali Ndiritu Kamundia
Geologist, Government of Kenya
P.O. Box 30009
Nairobi, Kenya

9. M. Jean-Pierre Lenoble
Institut français de recherche pour l'exploitation de la mer (IFREMER)
Chargé de Mission "Nodules polymétalliques" auprès du Président Directeur Général
66 Avenue d'Iéna
75116 Paris, France

10. Dr. Alfonso López-Reina
Director de Investigaciones Científicas de la Universidad Militar de Colombia
Carrera 11, calle 100
Bogotá, Colombia

11. Mr. Sulaiman Zuhdi Pane
General Manager, Joint Operating Body (JOB)
Pertamina-Japex North Sumatra Ltd.
Skyline Building, 19th Floor
Jln. M.H. Thamrin No. 9
Jakarta-10340, Indonesia

12. Ing. Luis G. Preval Páez
Principal Specialist of the Production, Investments and Metallurgical Mining Development Division of the Ministry of Basic Industry
Havana, Cuba

13. Mr. David W. Pasho
Director, Ocean Mining Division
Mineral Policy Sector
Department of Energy, Mines and Resources
Ottawa, Canada

14. Dr. Bodo Schirmer
Special Representative of the Minister of Geology
Central Geological Institute
Invalidenstrasse 44
1040 Berlin
German Democratic Republic

15. Dr. T. R. P. Singh
Senior Manager
Engineers India Ltd.,
R. K. Puram
New Delhi 110066
India

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.3
4 December 1987

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
New York, 7-18 December 1987

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEA-BED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF JAPAN FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

		Paragraphs	Page
LETTER OF TRANSMITTAL			53
INTRODUCTION		1 - 6	55
I.	Basic information regarding the application	7 - 11	58
II.	Examination of information and technical data submitted by the applicant	12 - 23	65
III.	Determination of equal estimated commercial value for the area recommended to be reserved for the Authority and the area recommended to be allocated to the applicant	24 - 45	67
IV.	Determination of equal estimated commercial value of areas referred to in LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (c) and (d)	46 - 51	71
V.	Recommendations	52	73

/...

CONTENTS (continued)

Page

Annexes

I. List of members of the Group of Technical Experts 74

II. List of co-ordinates*

---

* Confidential. Deposited with the Secretary-General.

/...

LETTER OF TRANSMITTAL

4 December 1987

Mr. José Luis Jesus
Chairman of the Preparatory Commission for
the International Sea-Bed Authority and
for the International Tribunal for the
Law of the Sea
New York, New York

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application of the Government of Japan, on behalf of Deep Ocean Resources Development Co., Ltd. (DORD), for registration as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts has undertaken an examination of the application in accordance with its mandate, and the attached report which was unanimously adopted contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 23 November and 4 December 1987, during which period the Group held 22 sessions.

The Group wishes to express its appreciation for the co-operation of the representatives of the applicant, Deep Ocean Resources Development Co., Ltd., and the Government of Japan.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist on the matter of registration of Japan. The Group also wishes to draw to your attention the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the Law of the Sea secretariat in providing assistance throughout our meetings.

Yours sincerely,

Signed in New York on 4 December 1987:

Samuel SONA BETAH
(Cameroon)

ZHANG Bingxi
(China)

Alfredo José DA SILVA NETTO
(Brazil)

/...

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)

Knut S. HEIER
(Norway)

Takeshi IZUMI
(Japan)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

Luis G. PREVAL PAEZ
(Cuba)

David W. PASHO
(Canada)

Bodo SCHIRMER
(German Democratic Republic)

T. R. P. SINGH
(India)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission of the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the Statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was mandated to determine whether the applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the Statement of understanding of 5 September 1986 and the Statement of understanding of 10 April 1987 (LOS/PCN/L.43/Rev.1) and to submit a report on each application to the General Committee. The Group noted that, in case of there being different opinions among its members, such opinions shall be included in the report. (LOS/PCN/L.41/Rev.1, annex, para. 4).

2. In accordance with the relevant decision of the Preparatory Commission, the application of Japan on behalf of Deep Ocean Resources Development Co., Ltd. (DORD), a corporation registered in Japan, was examined to ensure whether it was in conformity with resolution II, taking into account:

(a) That applicants who do not have practical problems and do not make voluntary advance relinquishments of areas shall be deemed to have complied with the requirements for relinquishment under resolution II, paragraph 1 (e), upon registration, provided that the total pioneer area allocated to them does not exceed 75,000 sq km (see LOS/PCN/L.41/Rev.1, annex, para. 10); and

(b) That "applicants with overlapping claims, namely France, Japan and the USSR, shall contribute portions of areas in the north-east Pacific Ocean covered by their respective revised applications that will constitute part of the area to be reserved for the Authority. The areas so contributed may be incorporated in any area for which the Enterprise may wish to submit a plan of work, and together they shall be of equal estimated commercial value to at least the average estimated commercial value of the three areas of up to 52,300 sq km to be allocated to the pioneer investors" pursuant to subparagraph (d) of this paragraph;

(c) "The contributions to be made by the three applicants for this purpose shall be as follows:

(i) France - an area totalling 20,000 sq km adjacent to its presently overlapping area with the Soviet Union;

(ii) Japan - an area totalling 17,300 sq km adjacent to its presently overlapping area with the Soviet Union;

(iii) Soviet Union - an area totalling 15,000 sq km 14,549 sq km of which will be from within its presently overlapping areas with France and with Japan and 451 sq km which it obtains from France following adjustment of claims between the two applicants;"

(d) "The total area to be allocated to each applicant shall not exceed 75,000 sq km after any relinquishment of areas referred to in paragraphs 9, 10 and 11 has been made. For the purpose of allocation, each applicant may indicate in its application portions of its application area up to a limit of 52,300 sq km that shall form part of the total area to be allocated to it by the Commission. In addition to the areas indicated by the applicants, the Commission shall allocate, in accordance with resolution II, paragraph 3, an area from their respective application areas necessary to complete the total area to be allocated to each applicant (see LOS/PCN/L.41/Rev.1, annex, para. 13 (1) (c) and (d) and (2)).

3. The Group of Technical Experts commenced its work on the morning of 23 November 1987. The Special Representative briefed the Group on its mandate and outlined the specific procedures that were in effect to ensure the confidentiality of data and information contained in the applications for registration before the Group.

4. The Group met again in the afternoon of 23 November 1987, at which time the Chairman of the Preparatory Commission, Mr. José Luis Jesus, addressed the Group. The Group then began its consideration of the three applications before it, beginning with the application of France.

5. The Group structured its work as follows:

(a) Stage I would involve:

(i) A preliminary examination of all technical data that was submitted for the application area;

(ii) A more detailed evaluation of data in the sectors where the Group will make recommendations to the General Committee concerning which sectors should be reserved for the Authority;

(iii) A tentative recommendation as to which sectors should be reserved for the Authority;

(b) For Stage II the Group felt it should have the benefit of technical data in those sectors from other applications that are adjacent to sectors in the Japanese application. After taking this information into account, the Group:

(i) Made a final recommendation concerning which sectors should be reserved for the Authority. The results are to be outlined in part III of the Group's report;

(ii) Determined whether the total area recommended for reservation by the Authority is of equal estimated commercial value to the area allocated to the applicant (LOS/PCN/L.41/Rev.1, annex, para. 13 (1) (b)). The results are to be outlined in part III C of the Group's report;

/...

(c) Stage III involved a comparison of the average estimated commercial value of the three areas identified by the respective applicants to be allocated to each applicant by the Commission (LOS/PCN/L.41/Rev.1, annex, para. 13 (2)), with the estimated commercial value of the total area composed of the contributions made by the applicants pursuant to LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (d). On the basis of this evaluation the Group would advise the General Committee whether or not the estimated commercial value of the contributed areas reserved for the Authority is equal to at least the average estimated commercial value of the three identified by the applicants for incorporation into the respective areas to be allocated to them. The results are to be presented in part IV of the Group's report.

6. The Group completed its work in the afternoon of 5 December 1987. In view of the large volume of work involved in processing and analysing the three applications, the Group had to work for long hours each day, including a public holiday and the weekends. During the entire period of work, the Secretariat provided all necessary facilities and assistance.

/...

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the Applicant

1. Name of of State(s) or certifying State(s):

Japan

2. Date of Signature of the Convention by the certifying State or States:

7 February 1983

3. Applicant:

a. Name Deep Ocean Resources Development Co., Ltd. (DORD)

b. Mailing Address
2-8 Kanda Surugadai
Chiyoda-ku
Tokyo, Japan

c. Telephone Number 03-294-4871

Telex Address 02224066 DORD J

d. Name of Designated Representative or Designated Authority Deep Ocean Resources Development Co., Ltd. (DORD)

e. Mailing Addresses
2-8 Kanda Surugadai
Chiyoda-ku, Tokyo, Japan

f. Telephone Number 03-294-4771

Telex Address 02224066 DORD J

/...

4. Status of the Applicant under resolution II, paragraph (1) (a) (i):

State ☐

State enterprise ☐

Natural or juridical person ☒

5. Certificate of registration as a juridical person (if applicable)

Submitted: Yes ☒ No ☐

Not Applicable ☐

6. Date of receipt of application: 21 August 1984

7. Date of receipt of revised application: 12 November 1987

/...

B. Data submitted by the Applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Co-ordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances that the application area is located beyond the limits of national jurisdiction of any State

Submitted: Yes ☒ No ☐

6. Assurances of compliance with the provisions of resolution II and the Statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1)

Submitted: Yes ☒ No ☐

C. Payment of Fee:

The applicant states that it will pay the fee of $US 250,000 to the Preparatory Commission after receiving the notification of registration of Deep Ocean Resources Development Co., Ltd. (DORD) as a pioneer investor.

/...

D. The application area and its division between the reserved area and the allocated area

7. The application area of Japan covers a total of approximately 225,000 sq km in the Clarion-Clipperton Zone of the Pacific Ocean. This area is distributed in three regions of 167,200 sq km, 41,900 sq km and 15,900 sq km respectively. The area of 41,900 sq km is located in the portion of the Clarion-Clipperton zone which is referred to as the "central" region (see table 1 and figures 1 and 2). This area consists of three segments. The other two areas are located in the eastern and western regions of the Clarion-Clipperton Zone, consisting of one segment and six segments respectively.

8. In accordance with paragraph 13 (2) of the annex to document LOS/PCN/L.41/Rev.1, the applicant has identified an area of 52,300 sq km for incorporation in the total area of 75,000 sq km to be allocated to it, in accordance with paragraph 10 of that document. This area consists of two segments: one of 18,000 sq km (SA_2) in the central region and the other of 34,300 sq km (SA_1) in the western region. In order to make up the 75,000 sq km to be allocated to the applicant, the applicant further identified two areas totalling 22,700 sq km each consisting respectively of Segment A of 22,700 sq km and two segments, B_1 in the western region and B_2 in the eastern region, of 6,800 sq km of 15,900 sq km respectively.

9. The total reserved area for the Authority will then consist of one of the two areas of 22,700 sq km, the area of 17,300 sq km contributed by the applicant in accordance with paragraph 13 (1) (c) and (d) of the annex to LOS/PCN/L.41/Rev.1 and the remainder of the application area consisting of 110,000 sq km. The latter area of 110,000 sq km is composed of sector AT_1 of 43,500 sq km, sector AT_2 of 23,100 sq km and sector AT_3 of 36,800 sq km, all in the western region, and the sector AT_4 of 6,600 sq km in the central region. Thus the total area to be reserved for the Authority will be 150,000 sq km.

/...

Table 1. Disposition of sectors in the application of Japan

(in square kilometres)

	Western region	Central region	Eastern region	Subtotals
Area identified by applicant for incorporation in the Area to be allocated to it	SA_1- 34 300	SA_2- 18 000		52 300
Selection from two areas of 22,700 sq km each in accordance with paragraph 13 (2)*				
A	22 700			22 700
or				
B_1 and B_2	B_1 6 800		B_2 15 900	22 700
				45 400
Remaining area for incorporated in the reserved Area	AT_1 43 500 AT_2 23 100 AT_3 36 800	AT_4 6 600		110 000
Area to be contributed by the applicant in accordance with paragraph 13 (1) (c) and (d)*		CONT - 17 300		17 300
Total	167 200	41 900	15 900	225 000

---

* References are to document LOS/PCN/41/Rev.1, annex.

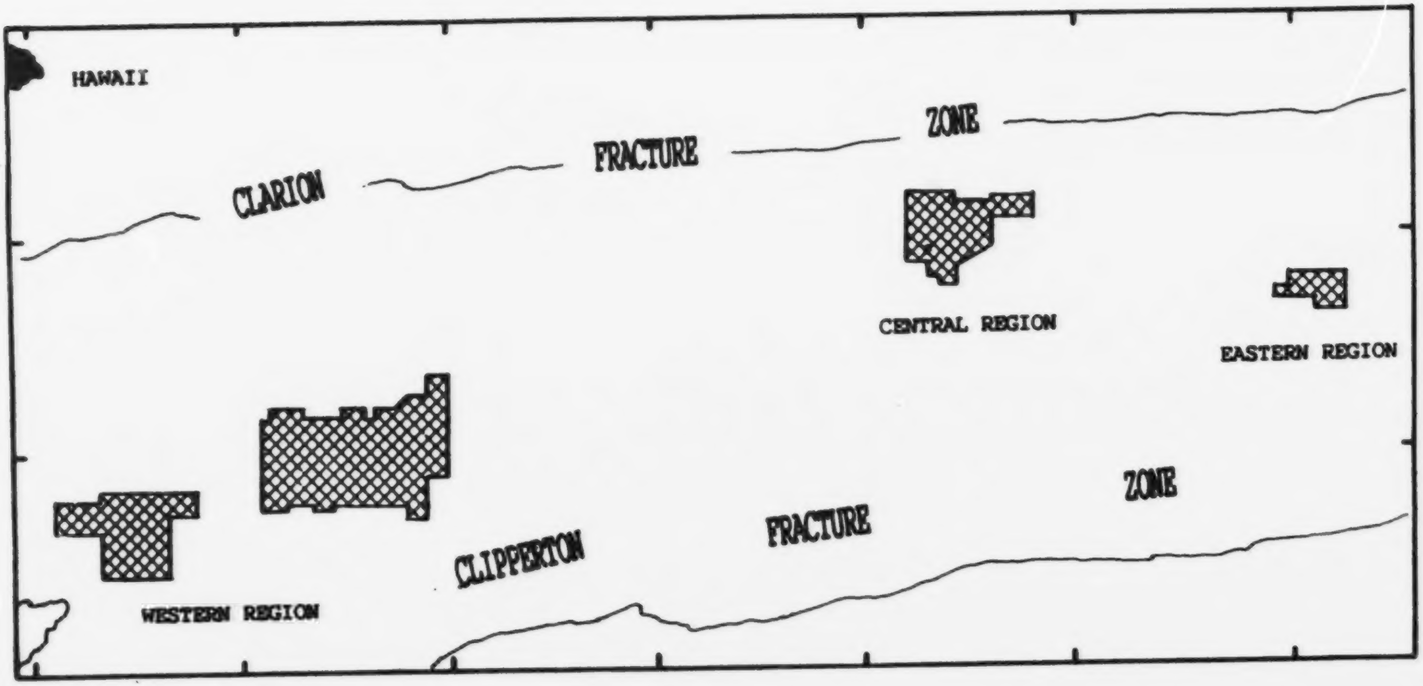


Figure 1. General location of the Japanese application areas in the Pacific Ocean.

/...

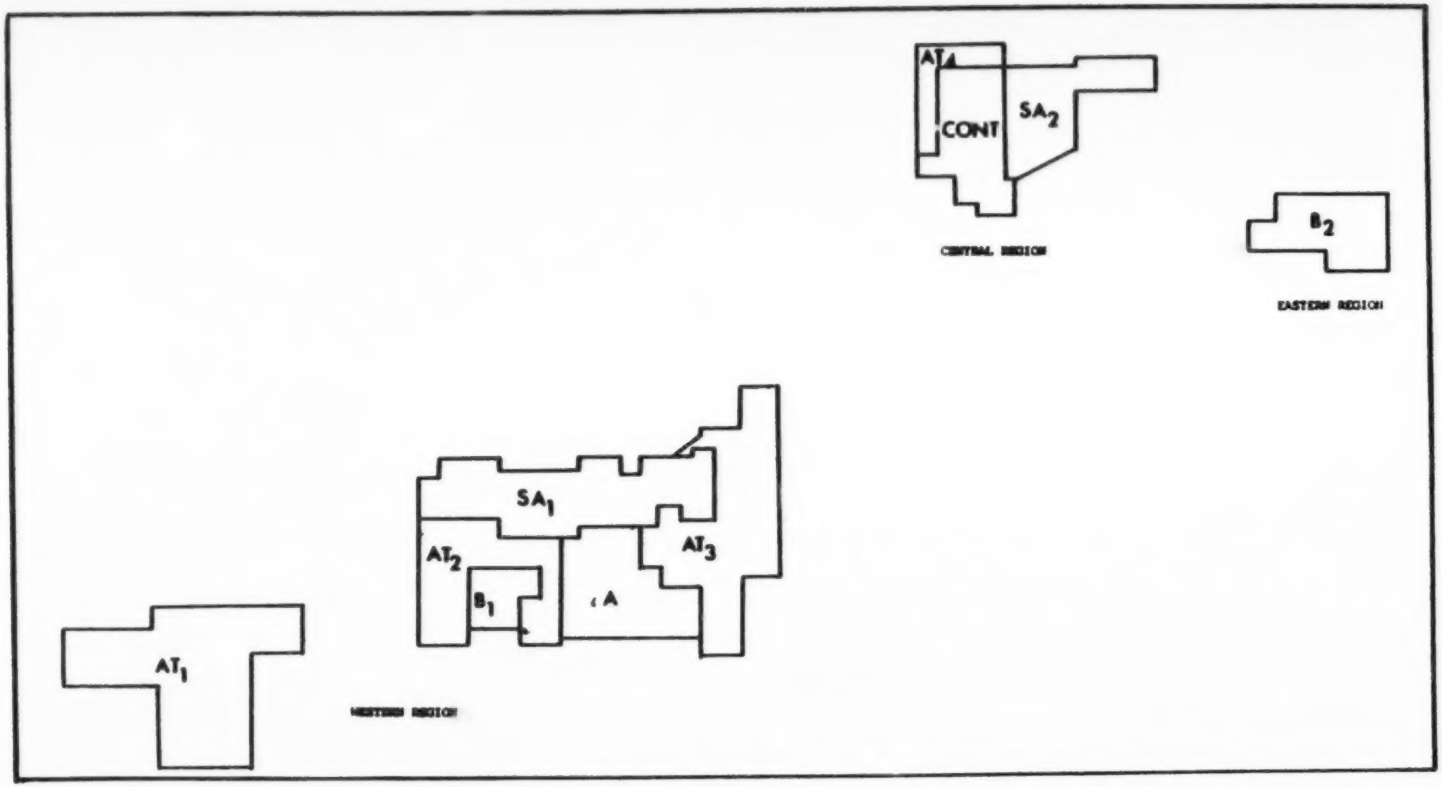


Figure 2. Disposition of sectors in the application of Japan.

/...

E. Overlaps and identification of contributed areas

10. In order to confirm there were no overlaps among the French, Japanese and Soviet application areas, all co-ordinates were plotted on a base map at a scale of 1:5,000,000. Common boundaries between application areas were examined graphically and by checking the individual co-ordinates. It was concluded that there were no overlaps among the areas applied for.

11. At the time applicants made their general introductory presentation to the Group, each applicant, in the presence of other applicants, identified the sector to be contributed by it to the Authority in the central region.

II. EXAMINATION OF INFORMATION AND TECHNICAL DATA SUBMITTED BY THE APPLICANT

A. Information and data submitted

12. The following technical documents were submitted in the application:

(a) A volume containing basic information related to the applicant, certification of the level of expenditure and assurances regarding the absence of overlapping areas;

(b) A volume containing technical information on the application areas including:

(i) Co-ordinates of application areas;

(ii) General map of application area;

(iii) Estimated ore reserve of each application area;

(iv) Data on testing in connection with prospecting;

(v) Catalogue of sampling data;

(vi) Sampling location, density and metal composition map;

(vii) Bathymetry and morphology map;

(c) A volume containing additional information on:

(i) The organization, financing and business experience of the applicant;

(ii) The technology and equipment used for prospecting.

13. The applicant's representatives also provided a supplementary table containing information on metal accumulation for nickel, copper, cobalt and manganese.

/...

14. The representatives of the applicant provided clarifications as required on information and technical data submitted.

15. It was noted that all technical data submitted in the application have been gathered using standard and recognized methods.

B. Methodology

1. General

16. The Group reviewed the methodology used to evaluate the application of India and concluded that similar methodology should be used to evaluate the application of Japan. The Group considered using a number of possible indicators that might be useful in assessing equal estimated commercial values of areas. It was recognized that any approach should be based on the fact that the data reflect the prospecting or exploration stage and that it should be based on a relative comparison of the areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

17. As in the case of India, the most important factors to be considered were the metal content, nodule abundance, bathymetry and geomorphology. Because the central and western regions are separated by some distance, possible differences in weather conditions that could affect exploration and mining operations were also considered.

18. The Japanese application provides information on grade and abundance at 559 station locations in the application area of 225,000 sq km. Information presented for a given station is the average of several samples in the immediate vicinity. The average area per station is 403 sq km. The stations are regularly spaced on a sampling grid approximately 20 sq km apart. Distribution of stations is similar in all sectors.

2. Abundance of nodules

19. Data on average abundance and nodule tonnage supplied in the application was checked for arithmetic accuracy. Total tonnage and the average tonnage per sq km was used for comparing various sectors and areas. The geographical distribution of abundance in the different areas was reviewed on maps provided by the applicant and analysed in order to determine whether areas being evaluated contained sectors of higher abundance.

3. Metal content

20. With respect to metal content, the Group evaluated the relative amounts of nickel, cobalt and manganese contained in the nodules for the sectors being considered. The basic information used to make these comparisons was provided by the applicant as the tonnage of each metal contained in the nodules per sq km at each location. The evaluations were checked for arithmetic accuracy. It was

/...

decided not to develop separate information on copper except in specific cases, in view of the well-established relationship between copper and nickel that allows the characteristics of copper to be closely approximated by the analysis of nickel.

21. Metal accumulation, together with per cent metal, was plotted on charts in order to evaluate the relative distribution and trends in the various sectors. This procedure was carried out for each individual metal and used to determine whether areas and sectors being evaluated contained larger areas of higher-grade nodules and/or greater quantity of contained metals.

22. As appropriate, cumulative frequency distributions of the metal accumulations in the various sectors were developed in order to allow the Group to make more detailed comparisons.

4. Bathymetry and geomorphology

23. The examination of bathymetric features in all sectors of the application area was carried out by checking and comparing all maps and information provided by the applicant. The nature of the data available at the prospecting stage only allows the possibility of a regional comparison of the sectors. The evaluation focused on the types of bathymetric features found in various sectors and their slope angles, sizes, frequency and distribution.

III. DETERMINATION OF EQUAL ESTIMATED COMMERCIAL VALUE FOR THE AREA RECOMMENDED TO BE RESERVED FOR THE AUTHORITY AND THE AREA RECOMMENDED TO BE ALLOCATED TO THE APPLICANT

A. General description

1. General features

24. All the selected sectors of the applicant are situated in a structural zone striking WSW-ENE. The zone is located between the Clarion Fracture Zone to the north and the Clipperton Fracture Zone to the south. It is an exceptional zone from the standpoint of the metal content and the high abundance of polymetallic nodule deposits and their quality. This possibly results from favourable tectonic and geological conditions that largely control the process of formation of the nodules.

25. This zone contains deposits that are more attractive as compared with deposits in regions outside the zone.

26. The WSW-ENE striking structural zone is considered as a tectonic element of the first order. Second-order tectonic elements such as abyssal hills and valleys with relief up to 200 m and volcanic structures with relief that may exceed 600 m are superimposed.

/...

2. Abundance of nodules

27. The abundance of nodules in the application area is relatively uniform without significant differences between the highs and the lows. The geographical distribution does not show significant differences between the different areas.

3. Metal content

28. Nickel. The application area is characterized by high nickel grade, interspersed with some lower-grade areas. Areas with high grade and abundance are scattered throughout most sectors. Sectors AT_2 and AT_4 have relatively poor metal values.

29. Manganese. The pattern of distribution of manganese accumulations followed the trend of nickel accumulations, and similar conclusions were drawn.

30. Cobalt. The spatial distribution of high cobalt accumulation throughout the application area was often accompanied by a high nodule abundance, and total cobalt accumulation was found to be generally consistently distributed throughout the application area.

4. Bathymetry and geomorphology

31. The bathymetric and geomorphological analyses of the areas have revealed that, despite some differences in the relief and frequency of secondary features, the bathymetry and geomorphology are comparable in the total application area. The sea-bottom in the application area is slightly hilly and characterized by irregularly distributed volcanic structures.

32. In general slopes do not exceed 8° except for volcanic structures, where slopes may reach 10° or more. The general direction of the second-order structures is mainly NNW-SSE, N-S in the central and eastern regions and E-W in the western region.

33. The Group concluded that when all factors are considered the sea-bottom topography in the areas is essentially similar.

B. Selection of additional areas for allocation

1. Abundance of nodules

34. The tonnage calculations presented in the application were checked for arithmetic accuracy. The statistical and spatial distribution of the abundance and tonnage of nodules in Sectors B_1 and B_2 and Sector A revealed no significant difference.

/...

2. Metal content

35. Nickel. Sector A shows relatively high nickel grade throughout but has high accumulation in some portions of the Sector. Both Sectors B_1 and B_2 have portions of high grade and abundance. There are no significant differences from the viewpoint of nickel.

36. Cobalt. Cobalt accumulation in Sector A and in the combination of Sectors B_1 and B_2 are similar, although Sector A may have a larger percentage of higher-grade nodules.

37. Manganese. Although from the viewpoint of manganese Sector B_2 is more interesting than either Sectors A or B_1, the aggregate area of Sectors B_1 and B_2 is similar to Sector A.

3. Bathymetry and geomorphology

38. No significant differences were noted between Sector A and Sectors B_1 and B_2 in terms of the type, frequency and distribution of topographic features. The regional water depth in Sector B_2 is, however, approximately 400 m to 600 m shallower than in Sectors A and B_1. Because this amounts to approximately 10 per cent of the water depth, the difference would have implications with respect to operating costs such as the energy requirements for lifting nodules, etc.

4. Conclusion

39. The Group decided to recommend for the consideration of the General Committee that Sectors B_1 and B_2 should be selected for incorporation into the area to be reserved for the Authority and that Sector A should be selected for incorporation into the area to be allocated to the applicant.

C. Evaluation of equal estimated commercial values of the total area to be reserved for the Authority and the total area to be allocated to the applicant

1. Criterion of size

40. With the recommendation of the additional area proposed for selection by the Group, the area that will be selected in accordance with LOS/PCN/L.41, annex, paragraph 13 (2) in addition to the 52,300 sq km area identified by the applicant to be allocated to it will be as follows:

Sector A in western region .... 22 700 sq km

41. The total of the two areas taken together amounts to 75,000 sq km. With this, the criterion of size has been met.

42. With the recommendation of the additional area proposed for selection by the Group, the area to be reserved for the Authority would comprise:

(a) Sector (CONT) in the central region to be contributed by the applicant in accordance with paragraph 13 (1) (c) and (d) 1/	17 300 sq km
(b) The additional areas selected in accordance with paragraph 13 (2):	
Sector B_1 in the western region	6 800 sq km
Sector B_2 in the eastern region	15 900
With a subtotal of	22 700 sq km
The remaining areas:	
Sector AT_1 in western region	43 500 sq km
Sector AT_2 in western region	23 100
Sector AT_3 in western region	36 800
Sector AT_4 in central region	6 600
With a subtotal of	110 000 sq km
The total area to be reserved will be	150 000 sq km

43. The area to be allocated to the applicant would comprise:

(a) The areas identified by the applicant for incorporation into the area to be allocated to it:	
Sector SA_1 in western region	34 300 sq km
Sector SA_2 in central region	18 000
With a subtotal of	52 300 sq km
(b) The sector selected in accordance with paragraph 13 (2):	
Sector A in western region	22 700 sq km
The total area to be allocated will be	75 000 sq km

/...

2. Evaluation of results

44. The results of all analyses carried out for the areas proposed to be reserved for the Authority and the areas proposed to be allocated to the applicant reveal the following:

(a) The area to be reserved for the Authority is much larger than the area to be allocated to the applicant. This offers more opportunities to the Authority of finding potential mine sites in the reserved area, taking also into account that it lies in the Clarion-Clipperton Zone known to have favourable geological and ore-controlling environments;

(b) The estimated total tonnages of the nodules and the metals are much higher in the area proposed to be reserved for the Authority due to its size than those proposed to be allocated to the applicant;

(c) The area containing higher abundance and metal grades relevant for future mining estimated statistically in the area to be reserved for the Authority as well as in the area to be allocated to the applicant is comparable;

(d) The geographical distribution of the areas containing high values appear more dispersed in the case of the area proposed to be reserved for the Authority than in the area proposed to be allocated to the applicant;

(e) The bathymetric and geomorphological features in the two areas are essentially similar.

3. Conclusion

45. Based on the results of investigations and analysis of the data available at the present level of prospecting and exploration for polymetallic nodules, the Group was of the view that both the areas offer similar potentials in terms of finding competitive mine sites in the respective areas. Accordingly, the estimated commercial value of the area proposed to be reserved for the Authority may thus be considered equal to the estimated commercial value of the area proposed to be allocated to the applicant.

IV. DETERMINATION OF EQUAL ESTIMATED COMMERCIAL VALUE OF AREAS REFERRED TO IN LOS/PCN/L.41/Rev.1, ANNEX, PARAGRAPH 13 (1) (c) and (d)

1. Adequacy of data

46. The Group considered that the data provided in the applications of France, Japan and the Soviet Union were sufficient to compare the estimated commercial value of the areas formed by the contributions made by each of the three applicants with the average of the estimated commercial values of the areas identified by each applicant for incorporation into their respective allocated areas.

/...

2. Criteria of size and location of the areas

47. The areas contributed by each applicant to the area to be reserved for the Authority under LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (c) and (d) meet the criteria for size and are located in the north-east Pacific Ocean referred to in this report as the "central region". The areas identified by each applicant for incorporation into the respective allocated areas amount to and do not exceed the limit of 52,300 sq km for each applicant.

48. The areas contributed by the applicants and areas identified by them are as follows:

	Areas identified for incorporation into the allocated areas (sq km)		Contributed areas (sq km)	
Applicant	Actual	Criteria	Actual	Criteria
France	52 290	52 300	20 180	20 000
Japan	52 300	52 300	17 300	17 300
Soviet Union	52 300	52 300	15 000	15 000

3. Results of evaluation

49. The results of various analyses made by the Group indicated that the combination of contributed areas were similar to the average of the three identified areas in respect of bathymetry. In respect of the average *in situ* tonnage of wet nodules, the average of the three identified areas was higher than the combination of contributed areas by 1 per cent. In respect of average manganese, nickel and copper metal tonnages *in situ*, the difference between the combined contributed areas and the average of the three identified areas was in the range of 6-8 per cent in favour of the identified areas, while for cobalt the difference was about 3 per cent in favour of the combination of contributed areas. These differences may be viewed in the context of the estimation error of about 30 per cent which is normal at this level of prospecting and exploration. It was further noted that the range of calculated tonnages for nodules as well as the metals were comparable particularly with respect to their upper limits.

50. The Group also noted that with the data available at this level of prospecting and exploration and with the attendant uncertainty in the estimates, the differences in *in situ* resources of the above magnitude were within the range of estimation errors in such situations. With the present level of knowledge, therefore, it emerges that the areas contributed by the applicants to be reserved for the Authority provide it with a fair and reasonable opportunity to find and develop a mine site that could be competitive with the mine sites that may be found in the areas identified by each applicant.

4. Conclusion

51. In view of the above considerations, the Group concluded that the estimated commercial value of the combination of the contributed areas may be considered to be equal to the average of the estimated commercial value of the areas identified by each of the three applicants.

V. RECOMMENDATIONS

52. The following conclusions were reached unanimously by the Group.

(a) Having examined the particulars submitted by the applicant which are summarized in part I of the present report, the Group has concluded that the application has been submitted in accordance with resolution II and the understandings contained in documents LOS/PCN/L.41/Rev.1 and LOS/PCN/L.43/Rev.1.

(b) As regards the designation of the reserved area and the allocation of the pioneer area, the Group, in the light of the conclusions reached in the present report, agreed to recommend for the consideration of the General Committee:

(i) That the area consisting of Sector CONT (17,300 sq km in the central region), Sector B_2 (15,900 sq km in the eastern region), Sector B_1 (6,800 sq km in the western region), Sector AT_1 (43,500 sq km in the western region), Sector AT_2 (23,100 sq km in the western region), Sector AT_3 (36,800 sq km in the western region) and Sector AT_4 (6,600 sq km in the central region) with a total of 150,000 sq km should be designated as the reserved area;

(ii) That the area consisting of Sector SA_1 (34,300 sq km in the western region), Sector SA_2 (18,000 sq km in the central region) and Sector A (22,700 sq km in the western region) with a total of 75,000 sq km should be designated as the pioneer area to be allocated to the applicant.

Notes

1/ The paragraphs referred to are in document LOS/PCN/L.41/Rev.1, annex.

Annex I

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

1. Mr. Samuel Sona Betah
Sub-Director of Geology
Ministry of Mines and Power
Yaoundé, Cameroon

2. Dr. Zhang Bingxi
Chairman, Advisory Committee for Science and Technology
Ministry of Geology and Mineral Resources
Beijing 100812, People's Republic of China

3. Dr. Alfredo José da Silva Netto
Assistant to the Directorate for Exploration and Production
PETROBRAS
Avenida República do Chile, 65, 23 Andar
Rio de Janeiro, RJ 20035
Brazil

4. Dr. Igor Sergeevich Gramberg
Director, Institute of Geology and Mineral Resources of the World's Oceans
Ministry of Geology of the USSR
Moscow, USSR

5. Dr. Knut S. Heier
Director
Geological Survey of Norway
Leiv Eirikssons v. 39
PO Box 3006 Lade
N-7002 Trondheim
Norway

6. Mr. Takeshi Izumi
Director General
Overseas Activities Department
Metal Mining Agency of Japan
Tokiwa Building,
1-24-14, Toranomon, Minato-ku
Tokyo, Japan

7. Mr. Hicuunga H. E. Kambaila
Chief Inspector of Mines
Mines Safety Department
P.O. Box 21006
Kitwe, Republic of Zambia

/...

8. Mr. Naphtali Ndiritu Kamundia
Geologist, Government of Kenya
PO Box 30009
Nairobi, Kenya

9. M. Jean-Pierre Lenoble
Institut français de recherche pour l'exploitation de la mer (IFREMER)
Chargé de Mission "Nodules polymétalliques" auprès
du Président Directeur Général
66 Avenue d'Iéna
75116 Paris, France

10. Dr. Alfonso López-Reina
Director de Investigaciones Científicas
de la Universidad Militar de Colombia
Carrera 11, calle 100
Bogotá, Colombia

11. Mr. Sulaiman Zuhdi Pane
General Manager, Joint Operating Body (JOB)
Pertamina-Japex North Sumatra Ltd.
Skyline Building, 19th Floor
Jln. M.H. Thamrin No. 9
Jakarta-10340, Indonesia

12. Ing. Luis G. Preval Páez
Principal Specialist of the Production, Investments
and Metallurgical Mining Development Division
of the Ministry of Basic Industry
Havana, Cuba

13. Mr. David W. Pasho
Director, Ocean Mining Division
Mineral Policy Sector
Department of Energy, Mines and Resources
Ottawa, Canada

14. Dr. Bodo Schirmer
Special Representative of the Minister of Geology
Central Geological Institute
Invalidenstrasse 44
1040 Berlin
German Democratic Republic

15. Dr. T. R. P. Singh
Senior Manager
Engineers India Ltd.
R. K. Puram
New Delhi 110066
India

/...

UNITED NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.4
4 December 1987

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED
AUTHORITY AND FOR THE
INTERNATIONAL TRIBUNAL FOR
THE LAW OF THE SEA
New York, 7-18 December 1987

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEA-BED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF THE UNION OF SOVIET SOCIALIST REPUBLICS FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

		Paragraphs	Page
LETTER OF TRANSMITTAL			78
INTRODUCTION		1 - 6	80
I.	Basic information regarding the application	7 - 12	83
II.	Examination of information and technical data submitted by the applicant	13 - 27	90
III.	Determination of equal estimated commercial value for the area recommended to be reserved for the Authority and the area to be recommended to be allocated to the applicant	28 - 49	93
IV.	Determination of equal estimated commercial value of areas referred to in LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (c) and (d)	50 - 55	97
V.	Recommendations	56	98

/...

CONTENTS (continued)

Page

Annexes

I. List of members of the Group of Technical Experts 100

II. List of co-ordinates*

---

[*] Confidential. Deposited with the Secretary-General.

/...

LETTER OF TRANSMITTAL

4 December 1987

Mr. José Luis Jesus
Chairman of the Preparatory Commission for
the International Sea-Bed Authority and
for the International Tribunal for the
Law of the Sea
New York, New York

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application of the Government of the Union of Soviet Socialist Republics, on behalf of "Yuzhmorgeologiya", for registration as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts has undertaken an examination of the application in accordance with its mandate, and the attached report which was unanimously adopted contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 23 November and 4 December 1987, during which period the Group held 22 sessions.

The Group wishes to express its appreciation for the co-operation of the representatives of the applicant, "Yuzhmorgeologiya", and the Government of the Union of Soviet Socialist Republics.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist on the matter of registration of the Union of Soviet Socialist Republics. The Group also wishes to draw to your attention the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the Law of the Sea secretariat in providing assistance throughout our meetings.

Yours sincerely,

Signed in New York on 4 December 1987:

Samuel SONA BETAH
(Cameroon)

ZHANG Bingxi
(People's Republic of China)

/...

Alfredo José DA SILVA NETTO
(Brazil)

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)

Knut S. HEIER
(Norway)

Takeshi IZUMI
(Japan)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

Luis G. PREVAL PAEZ
(Cuba)

David W. PASHO
(Canada)

Bodo SCHIRMER
(German Democratic Republic)

T. R. P. SINGH
(India)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission of the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the Statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was mandated to determine whether the applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the Statement of understanding of 5 September 1986 and the Statement of understanding of 10 April 1987 (LOS/PCN/L.43/Rev.1) and to submit a report on each application to the General Committee. The Group noted that in case of there being different opinions among its members, such opinions shall be included in the report (LOS/PCN/L.41/Rev.1, annex, para. 4).

2. In accordance with the relevant decision of the Preparatory Commission, the application of the Union of Soviet Socialist Republics, on behalf of "Yuzhmorgeologiya", was examined to ensure whether it was in conformity with resolution II, taking into account:

(a) That "in order to meet certain practical problems and, in particular, to take into account the interests of potential applicants under resolution II, paragraph 1 (a) (ii), an applicant who has practical problems may voluntarily relinquish in advance portions of the application areas simultaneously with its registration as a pioneer investor. The areas relinquished in these circumstances may exceed 75,000 sq km and shall be without prejudice to paragraph 13 below. The applicants so relinquishing shall be deemed to have complied with the provisions of resolution II, paragraph 1 (e)" (see LOS/PCN/L.41/Rev.1, annex, para. 9); and

(b) "The relinquished areas, referred to in paragraph 9, shall remain deposited with the Preparatory Commission and will be reserved to form part of the application areas of potential Applicants qualified to apply as pioneer investors under resolution II, paragraph 1 (a) (11), until the Convention enters into force" (LOS/PCN/L.41/Rev.1, annex, para. 12);

(c) "The areas to be designated in respect of each application as an area to be reserved for the conduct of activities by the Authority through the Enterprise or in association with developing countries shall be not less than one half of the total area applied for by each Applicant. In the case where an applicant has relinquished over 75,000 sq km under paragraph 9 above, the area to be reserved for the Authority may be reduced, but in any case it shall not be less than 75,000 sq km" (LOS/PCN/L.41/Rev.1, annex, para. 13 (1) (a));

(d) That "applicants with overlapping claims, namely France, Japan and the USSR, shall contribute portions of areas in the north-east Pacific Ocean covered by their respective revised applications that will constitute part of the area to be reserved for the Authority. The areas so contributed may be incorporated in any

/...

area for which the Enterprise may wish to submit a plan of work, and together they shall be of equal estimated commercial value to at least the average estimated commercial value of the three areas of up to 52,300 sq km to be allocated to the pioneer investors pursuant to paragraph 13 (2)";

(e) "The contribution to be made by the three applicants for this purpose shall be as follows:

(i) France - an area totalling 20,000 sq km adjacent to its presently overlapping area with the Soviet Union;

(ii) Japan - an area totalling 17,300 sq km adjacent to its presently overlapping area with the Soviet Union;

(iii) Soviet Union - an area totalling 15,000 sq km 14,549 sq km of which will be from within its presently overlapping areas with France and with Japan and 451 sq km which it obtains from France following adjustment of claims between the two applicants;"

(f) "The total area to be allocated to each applicant shall not exceed 75,000 sq km after any relinquishment of areas referred to in paragraphs 9, 10 and 11 has been made. For the purpose of allocation, each applicant may indicate in its application portions of its application area up to a limit of 52,300 sq km that shall form part of the total area to be allocated to it by the Commission. In addition to the areas indicated by the applicants, the Commission shall allocate, in accordance with resolution II, paragraph 3, an area from their respective application areas necessary to complete the total area to be allocated to each applicant." (see LOS/PCN/L.41/Rev.1, annex, para. 13 (1) (c) and (d) and (2)).

3. The Group of Technical Experts commenced its work on the morning of 23 November 1987. The Special Representative briefed the Group on its mandate and outlined the specific procedures that were in effect to ensure the confidentiality of data and information contained in the applications for registration before the Group.

4. The Group met again in the afternoon of 23 November 1987, at which time the Chairman of the Preparatory Commission, Mr. José Luis Jesus, addressed the Group. The Group then began its consideration of the three applications before it, beginning with the application of France.

5. The Group structured its work as follows:

(a) Stage I would involve:

(i) A preliminary examination of all technical data that was submitted for the application area;

(ii) A more detailed evaluation of data in the sectors where the Group will make recommendations to the General Committee concerning which sectors should be reserved for the Authority;

/...

(iii) A tentative recommendation as to which sectors should be reserved for the Authority;

(b) For Stage II the Group felt it should have the benefit of technical data in those sectors from other applications that are adjacent to sectors in the Soviet Union's application. After taking this information into account, the Group:

(i) Would make a final recommendation concerning which sectors should be reserved for the Authority. The results are to be outlined in part III of the Group's report;

(ii) Would determine whether the total area recommended for reservation by the Authority is of equal estimated commercial value to the area allocated to the applicant (LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (b)). The results are to be outlined in part III C of the Group's report;

(c) Stage III involved a comparison of the average estimated commercial value of the three areas identified by the respective applicants to be allocated to each applicant by the Commission (LOS/PCN/L.41/Rev.1, annex, para. 13 (2)), with the estimated commercial value of the total area composed of the contributions made by the applicants pursuant to LOS/PCN/L.41/Rev.1, annex, para. 13 (1) (d). On the basis of this evaluation the Group would advise the General Committee whether or not the estimated commercial value of the contributed areas reserved for the Authority is equal to at least the average estimated commercial value of the three areas identified by the applicants for incorporation into the respective areas to be allocated to them. The results are to be presented in part IV of the Group's report.

6. The Group completed its work in the afternoon of 5 December 1987. In view of the large volume of work involved in processing and analysing the three applications, the Group had to work for long hours each day, including a public holiday and the weekends. During the entire period of work, the Secretariat provided all necessary facilities and assistance.

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the applicant

1. Name of State(s) or certifying State(s):

Union of Soviet Socialist Republics

2. Date of Signature of the Convention by the certifying State or States:

10 December 1982

3. Applicant:

a. Name "Yuzhmorgeologiya"

b. Mailing Address
79, Krasnogvardeyskaya Street
Gelendzhik
Krasnodarskiy Kray, USSR 353470

c. Telephone Number 2 43-31

Telex Address GEO SU 279124

d. Name of Designated Representative or Designated Authority "Yuzhmorgeologiya"

e. Mailing Addresses
79 Krasnogvardeyskaya Street
Gelendzhik, Krasnodarskiy Kray
USSR 353470

f. Telephone Number 2 43-31

Telex Address GEO SU 279124

/...

4. Status of the applicant under resolution II, paragraph (1) (a) (i):

State ☐

State enterprise ☒

Natural or juridical person ☐

5. Certificate of registration as a juridical person (if applicable)

Submitted: Yes ☐ No ☐

Not Applicable ☒

6. Date of receipt of application: 20 July 1983

7. Date of receipt of revised application: 15 November 1987

B. Data submitted by the applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Co-ordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances that the application area is located beyond the limits of national jurisdiction of any State

Submitted: Yes ☒ No ☐

6. Assurances of compliance with the provisions of resolution II and the Statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1)

Submitted: Yes ☒ No ☐

C. Payment of Fee:

The applicant states that the fee of $US 250,000 for the registration of the State enterprise "Yuzhmorgeologiya" as a pioneer investor will be paid after the applicant is notified by the Preparatory Commission about the registration.

/...

D. The application area and its division between the reserved Area and the allocated Area

7. The application area of the Soviet Union covers a total of 300,000 sq km in the Clarion-Clipperton Zone of the Pacific Ocean. This area is distributed over two regions of 123,759 sq km and 176,241 sq km respectively. The first region is located in the portion of the Clarion-Clipperton Zone which is referred to as the "central" region and the other in the "western" region (see table 1 and figures 1 and 2).

8. The applicant has identified a total area of 92,672 sq km of the application area to be voluntarily relinquished simultaneously with its registration as a pioneer investor. In accordance with LOS/PCN/L.41/Rev.1, annex, paragraphs 9 and 12, this area shall remain deposited with the Preparatory Commission and will be reserved to form part of the application areas of potential applicants qualified to apply as pioneer investors under resolution II, paragraph 1 (a) (ii), until the Convention enters into force. The area identified for relinquishment is composed of sectors V_A to V_G, which fall partly in the central and partly in the western region.

9. In accordance with paragraph 13 (2) of the annex to LOS/PCN/L.41/Rev.1, the applicant has identified an area of 52,300 sq km for incorporation in the total area of 75,000 sq km to be allocated to it, in accordance with paragraph 10 of that document. This area consists of Sector III in the central region. In order to make up the 75,000 sq km to be allocated to the applicant, the applicant further identified two areas of 22,700 sq km each in accordance with resolution II, paragraph 3. Each of these two areas consists of two segments. These segments are:

X_1 (8,940 sq km) in the central region
X_2 (13,760 sq km) in the western region

Y_1 (8,940 sq km) in the central region
Y_2 (13,760 sq km) in the western region

10. The total area to be reserved for the Authority will then consist of one of the two areas of 22,700 sq km, the area of 15,000 sq km (Sector II in the central region), contributed by the applicant in accordance with paragraph 13 (1) (c) and (d) of the annex to LOS/PCN/L.41/Rev.1, and the remainder of the application area consisting of 46,267 sq km (Sector VI_1) and 48,361 sq km (Sector VI_2), both in the western region. Thus the total area to be reserved for the Authority will be 132,328 sq km.

Table 1. Disposition of sectors in the application of the USSR

(in square kilometres)

	Western region		Central region		Subtotal
Area identified by applicant for incorporation in the Area to be allocated to it			III	52 300	52 300
Selection from two areas of 22,700 sq km each in accordance with paragraph 13 (2)*					
X_2 and X_1	X_2	13 760	X_1	8 940	
Y_2 and Y_1	Y_2	13 760	Y_1	8 940	45 400
Remaining area for incorporation in the reserved Area	VI_1	46 267			
	VI_2	48 361			4 628
Area to be contributed by the applicant in accordance with paragraph 13 (1) (c) and (d)*			II	15 000	15 000
Subtotal		122 148		85 180	207 328
Area identified for relinquishment					92 672
Total area					300 000

---

* LOS/PCN/L.41/Rev.1, annex.

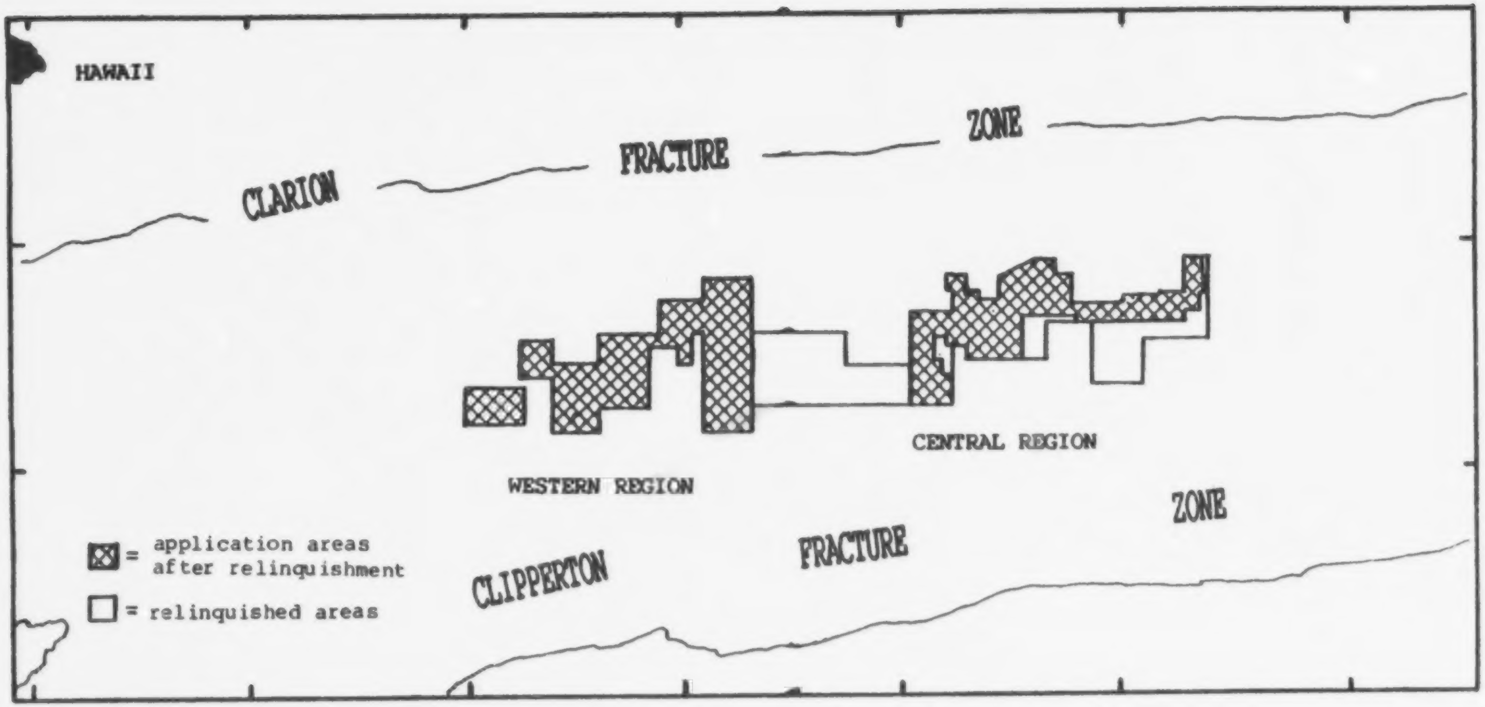


Figure 1. General location of the Soviet Union's application areas in the Pacific Ocean.

/...

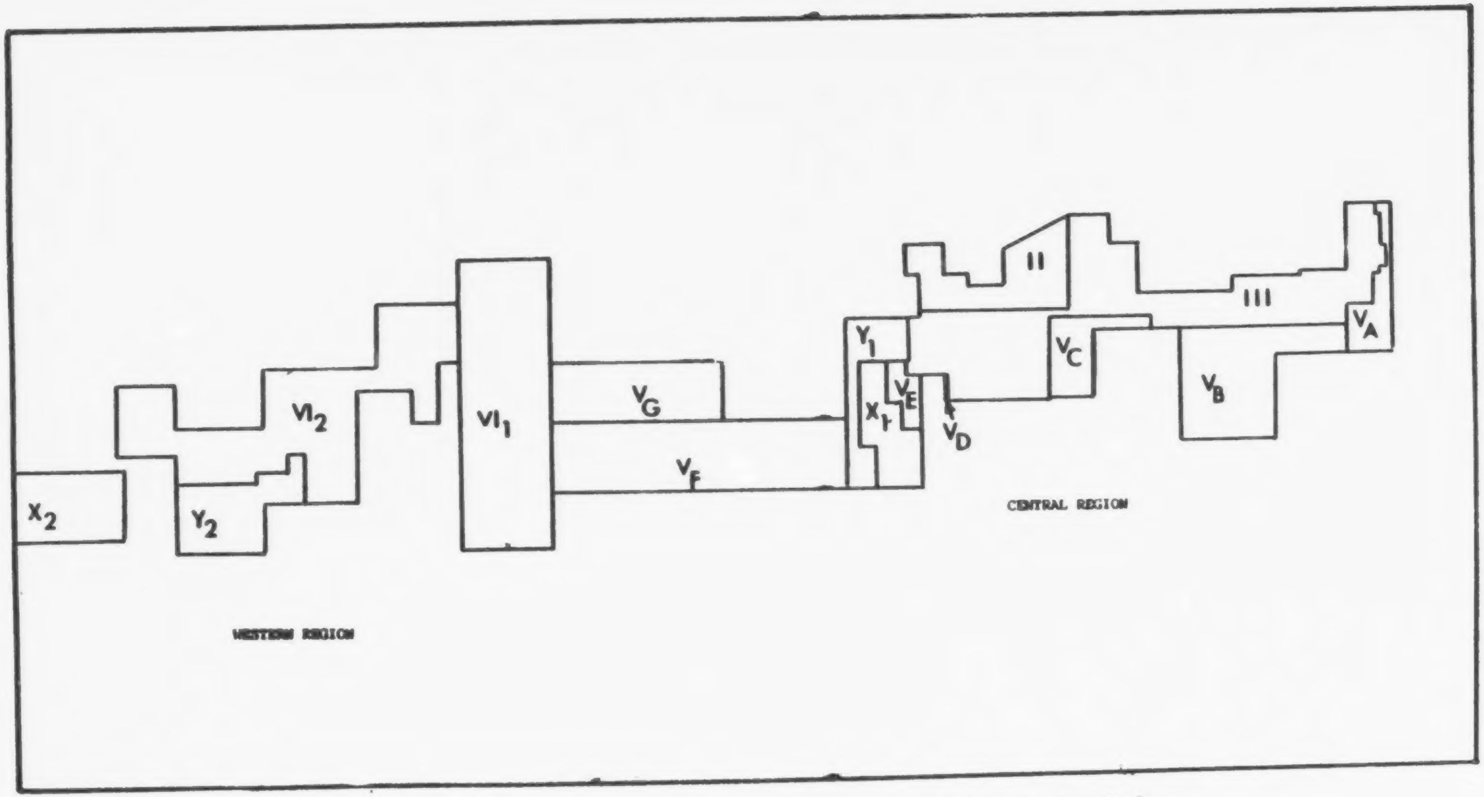


Figure 2. Disposition of sectors in the application of the Soviet Union.

/...

E. Overlaps and applicant contribution

11. In order to confirm that there were no overlaps among the French, Japanese and Soviet application areas, all co-ordinates were plotted on a base map at a scale of 1:5,000,000. Common boundaries between application areas were examined graphically and by checking the individual co-ordinates. It was concluded that there were no overlaps among the areas applied for.

12. At the time applicants made their general introductory presentation to the Group, each applicant, in the presence of other applicants, identified the sector to be contributed by it to the Authority in the central region.

II. EXAMINATION OF INFORMATION AND TECHNICAL DATA SUBMITTED BY THE APPLICANT

A. Information and data submitted

13. The following technical documents were submitted in the application:

(a) A volume containing basic information related to the applicant, certification of the level of expenditure, assurances regarding the absence of overlapping areas and the following technical data and information:

(i) Overview map of the application area;

(ii) List of co-ordinates of the application area;

(iii) Map indicating the location of the sectors in the application area;

(iv) List of co-ordinates of geological stations and chemical analysis of nodules;

(v) Estimated commercial value of the sectors in the application area;

(vi) Technical characteristics of the equipment used for prospecting;

(b) A series of maps showing:

(i) Geological stations;

(ii) Bathymetry;

(iii) Geomorphological divisions;

(iv) Nodule population.

14. The applicant's representatives also provided the following:

(a) Supplementary information on prospecting technology;

(b) The nature of "Yuzhmorgeologiya" and the history of their prospecting work;

(c) Additional copies of charts to facilitate the Group's analysis.

15. The representatives of the applicant provided clarifications as required on information and technical data submitted.

16. It was noted that all technical data submitted in the application have been gathered using standard and recognized methods.

B. Methodology

1. General

17. The Group reviewed the methodology used to evaluate the application of India and concluded that similar methodology should be used to evaluate the application of the USSR. The Group considered using a number of possible indicators that might be useful in assessing equal estimated commercial values of areas. It was recognized that any approach should be based on the fact that the data reflect the prospecting or exploration stage and that it should be based on a relative comparison of the areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

18. As in the case of India, the most important factors to be considered were the metal content, nodule abundance, bathymetry and geomorphology. Because the central and western regions are separated by some distance, possible differences in weather conditions that could affect exploration and mining operations were also considered.

19. The Soviet Union application provides information on grade and abundance at 1,177 sample locations in the area of 207,328 sq km. The information presented for a given station is the average of several observations in the immediate vicinity. For the vast majority of the application area, the sample locations are regularly spaced on a sample grid 13 km apart.

2. Abundance of nodules

20. Data on average abundance and nodule tonnage supplied in the application was checked for arithmetic accuracy. Total tonnage and the average tonnage per sq km was used for comparing various sectors and areas. The geographical distribution of abundance in the different areas was reviewed on maps provided by the applicant and analysed in order to determine whether areas being evaluated contained sectors of higher abundance.

/...

3. Metal content

21. With respect to metal content, the Group evaluated the relative amounts of nickel, cobalt and manganese contained in the nodules for the sectors being considered. The basic information used to make these comparisons was provided by the applicant as the tonnage of each metal contained in the nodules per sq km at each location. The evaluations were checked for arithmetic accuracy. It was decided not to develop separate information on copper, except in specific cases, in view of the well-established relationship between copper and nickel that allows the characteristics of copper to be closely approximated by the analysis of nickel.

22. Metal accumulation, together with per cent metal, was plotted on charts in order to evaluate the relative distribution and trends in the various sectors. This procedure was carried out for each individual metal and used to determine whether areas and sectors being evaluated contained larger areas of higher-grade nodules and/or greater quantity of contained metals.

23. As appropriate, cumulative frequency distributions of the metal accumulations in the various sectors were developed in order to allow the Group to make more detailed comparisons.

24. The Group noted some variation between their calculations for tonnage of wet nodules, and metals and those in the Soviet Union's application for Sector X_1. The tonnage estimate calculations by the Group were slightly higher than those provided by the applicant. This is attributed to legitimate differences in methodology and, while not considered to be of significance, it is taken into account by the Group.

4. Bathymetry and geomorphology

25. The examination of bathymetric features in all sectors of the application area was carried out by checking and comparing all maps and information provided by the applicant. The nature of the data available at the prospecting stage only allows the possibility of a regional comparison of the sectors.

26. In addition to the bathymetric map, the Soviet Union's application included a map illustrating various geomorphological units and major structural features within the application area. This facilitated the analysis of the Group.

27. The evaluation focused on the types of bathymetric features found in various sectors and their slope angles, size, frequency and distribution.

/...

III. DETERMINATION OF EQUAL ESTIMATED COMMERCIAL VALUE FOR THE AREA RECOMMENDED TO BE RESERVED FOR THE AUTHORITY AND THE AREA RECOMMENDED TO BE ALLOCATED TO THE APPLICANT

A. General description

1. General features

28. All the selected sectors of the applicant are situated in a structural zone striking WSW-ENE. The zone is located between the Clarion Fracture Zone to the north and the Clipperton Fracture Zone to the south. It is an exceptional zone from the standpoint of the metal content and the high abundance of polymetallic nodule deposits. This possibly results from favourable tectonic and geological conditions that largely control the process of formation of the nodules.

29. This zone contains deposits that are more attractive as compared with deposits in regions outside the zone.

30. The WSW-ENE striking structural zone is considered to be a tectonic element of the first order. Second order tectonic elements such as abyssal hills and valleys with relief up to 200 m and volcanic structures with relief that may exceed 600 m are superimposed.

2. Abundance of nodules

31. The abundance of nodules in the application area varies considerably from one location to another. In most of the areas, it was not possible to determine consistent areas of low and high abundance. In some places, the low abundance areas that could be delineated are rather doubtful due to the complicated shapes and probably do not represent the actual distribution on the sea-bottom.

3. Metal content

32. Nickel. Because of the small distance between sample locations and the general uniformity of nickel grade, regional patterns of nickel accumulation were difficult to ascertain. Areas of high accumulation are interspersed with areas of low accumulation throughout all sectors, although a somewhat lower percentage of Sectors VI_1 and VI_2 have favourable accumulations. In the specific case of Sector X_2, the smaller amount of data makes comparison with other sectors difficult.

33. Manganese. Manganese was considered with respect to metal accumulation in both areas. The analyses of the data show the same pattern as in the case of nickel, and the same conclusion is drawn.

34. Cobalt. The spatial distribution of cobalt accumulation was found to be generally consistent throughout the application area.

/...

4. Bathymetry and geomorphology

35. The bathymetric and geomorphological analyses of the areas have revealed that, despite some differences in the relief and frequency of secondary features, the bathymetry and geomorphology are comparable in the total application area. The sea-bottom in the application area is slightly hilly and characterized by irregularly distributed volcanic structures.

36. In general, slopes do not exceed 8°, except for volcanic structures, where slopes may reach 10° or more. The general direction of the second-order structures is mainly NNW-SSE and N-S in the central region.

37. The Group concluded that when all factors are considered the sea-bottom topography in the areas is essentially similar.

B. Selection of additional areas for allocation

1. Abundance of nodules

38. The statistical and geographical distribution of abundance and tonnage of nodules in the sectors being evaluated indicates that they are of equal commercial value.

2. Metal content

39. Nickel. The Group's calculation of nickel tonnages in Sectors X_2, Y_1 and Y_2 were in good agreement with the information in the application and in the case of X_1 were slightly higher. Sector X_1 has an area of high nickel accumulation that the Group considered attractive.

40. Based on all the calculations, it appears that Sectors X_1 and X_2 compare favourably with Sectors Y_1 and Y_2. Because X_1 has a high-grade zone with a relatively higher concentration than Y_1, the combination of X_1 and X_2 is favoured from the standpoint of nickel.

41. Cobalt. While an analysis of the grade and tonnage suggests that Sectors X_1 and X_2 and Sectors Y_1 and Y_2 are similar, the latter sectors are favoured on the basis of metal accumulation.

42. Manganese. The distributions of manganese concentrations in Sectors X_1 and X_2 and Sectors Y_1 and Y_2 are virtually identical. Sector X_1, however, has a larger area of higher values than the other sectors and better concentrations.

3. Bathymetry and geomorphology

43. From the standpoint of bathymetry and geomorphology, Sectors X_1 and Y_1 are similar and occur on a generally elevated region in the application area. Sector Y_2, as compared to X_2, has a higher frequency of sea mounts and

/...

relatively steep slopes that would not be favourable for mining. Sectors X_1 and X_2 show slightly better regional relief features.

4. Conclusion

44. The Group decided to recommend for consideration of the General Committee that Sectors X_1 and X_2 should be selected for inclusion in the area to be reserved for the Authority and that Sectors Y_1 and Y_2 should be selected for incorporation into the area to be allocated to the applicant.

C. Evaluation of equal estimated commercial values in the total area to be reserved for the Authority and the total area to be allocated to applicant

1. Criterion of size

45. With the recommendation of the additional area proposed for selection by the Group, the area that will be selected in accordance with LOS/PCN/L.41/Rev.1, annex, paragraph 13 (2), in addition to the 52,300 sq km area identified by the applicant to be allocated to it will be as follows:

In the central region, Sector Y_1	8 940 sq km
In the western region, Sector Y_2	13 760
	22 700 sq km

The total of the two areas taken together amounts to 75,000 sq km. With this, the criterion of size has been met.

46. With the recommendation of the additional area proposed for selection by the Group, the area to be reserved for the Authority would comprise:

(a) Sector II in the central region to be contributed by the applicant in accordance with paragraph 13 (1) (c) and (d) 1/	15 000 sq km
(b) The additional areas selected in accordance with paragraph 13 (2):	
Sector X_1 in the central region	8 940 sq km
Sector X_2 in the western region	13 760
with a subtotal of	22 700 sq km
(c) The remaining sectors:	
Sector VI_1 in the western region	48 361 sq km
Sector VI_2 in the western region	46 267
with a subtotal of	94 628 sq km
The total area to be reserved will be	132 328 sq km

/...

best copy available

47. The area to be allocated to the applicant would comprise:

(a) The area identified by the applicant for incorporation in the area to be allocated to it:

Sector III in the central region	52 300 sq km

(b) The sectors selected in accordance with paragraph 13 (2):

Sector Y_1 in the central region	8 940 sq km
Sector Y_2 in the western region	13 760
with a subtotal of	22 700 sq km
The total area to be allocated will be	75 000 sq km

2. Evaluation of results

48. The results of all analyses carried out for the areas proposed to be reserved for the Authority and the areas proposed to be allocated to the applicant reveal the following:

(a) The area to be reserved for the Authority is much larger than the area to be allocated to the applicant. This offers more opportunities to the Authority of finding potential mine sites in the reserved area, taking also into account that it lies in the Clarion-Clipperton Zone known to have favourable geological and ore-controlling environments;

(b) The estimated total tonnages of the nodules and the metals are much higher in the area proposed to be reserved for the Authority due to its size than those proposed to be allocated to the applicant;

(c) The area containing higher abundance and metal grades relevant for future mining estimated statistically in the area to be reserved for the Authority as well as in the area to be allocated to the applicant is comparable;

(d) The geographical distribution of the areas containing high values appear more dispersed in the case of the area proposed to be reserved for the Authority than in the area proposed to be allocated to the applicant;

(e) The bathymetric and geomorphological features in the two areas are essentially similar.

3. Conclusion

49. Based on the results of investigations and analysis of the data available at the present level of prospecting and exploration for polymetallic nodules, the Group was of the view that both the areas offer similar potentials in terms of finding competitive mine sites in the respective areas. Accordingly, the estimated commercial value of the area proposed to be reserved for the Authority may thus be considered equal to the estimated commercial value of the area proposed to be allocated to the applicant.

IV. DETERMINATION OF EQUAL ESTIMATED COMMERCIAL VALUE OF AREAS REFERRED TO IN LOS/PCN/L.41/Rev.1, ANNEX, PARAGRAPH 13 (1) (c) AND (d)

1. Adequacy of data

50. The Group considered that the data provided in the applications of France, Japan and the Soviet Union were sufficient to compare the estimated commercial value of the areas formed by the contributions made by each of the three applicants with the average of the estimated commercial values of the areas identified by each applicant for incorporation into their respective allocated areas.

2. Criteria of size and location of the areas

51. The areas contributed by each applicant to the area to be reserved for the Authority under LOS/PCN/L.41/Rev.1, annex, paragraph 13 (1) (c) and (d) meet the criteria for size and are located in the north-east Pacific Ocean referred to in this report as the "central region". The areas identified by each applicant for incorporation into the respective allocated areas amount to and do not exceed the limit of 52,300 sq km for each applicant.

52. The areas contributed by the applicants and areas identified by them are as follows:

	Areas identified for incorporation into the allocated areas (sq km)		Contributed areas (sq km)	
Applicant	Actual	Criteria	Actual	Criteria
France	52 290	52 300	20 180	20 000
Japan	52 300	52 300	17 300	17 300
Soviet Union	52 300	52 300	15 000	15 000

/...

3. Results of evaluation

53. The results of various analyses made by the Group indicated that the combination of contributed areas were similar to the average of the three identified areas in respect of bathymetry. In respect of the average *in situ* tonnage of wet nodules, the average of the three identified areas was higher than the combination of contributed areas by 1 per cent. In respect of average manganese, nickel and copper metal tonnages *in situ*, the difference between the combined contributed areas and the average of the three identified areas was in the range of 6 to 8 per cent in favour of the identified areas, while for cobalt the difference was about 3 per cent in favour of the combination of contributed areas. These differences may be viewed in the context of the estimation error of about 30 per cent which is normal at this level of prospecting and exploration. It was further noted that the range of calculated tonnages for nodules as well as the metals were comparable particularly with respect to their upper limits.

54. The Group also noted that with the data available at this level of prospecting and exploration and with the attendant uncertainty in the estimates, the differences in *in situ* resources of the above magnitude were within the range of estimation errors in such situations. With the present level of knowledge, therefore, it emerges that the areas contributed by the applicants to be reserved for the Authority provide it with a fair and reasonable opportunity to find and develop a mine site that could be competitive with the mine sites that may be found in the areas identified by each applicant.

4. Conclusion

55. In view of the above considerations, the Group concluded that the estimated commercial value of the combination of the contributed areas may be considered to be equal to the average of the estimated commercial value of the areas identified by each of the three applicants.

V. RECOMMENDATIONS

56. The following conclusions were reached unanimously by the Group.

(a) Having examined the particulars submitted by the applicant which are summarized in part I of the present report, the Group has concluded that the application has been submitted in accordance with resolution II and the understandings contained in documents LOS/PCN/L.41/Rev.1 and LOS/PCN/L.43/Rev.1.

(b) As regards the designation of the reserved area and the allocation of the pioneer area, the Group, in the light of the conclusions reached in the present report, agreed to recommend for the consideration of the General Committee:

(i) That the area consisting of Sector II (15,000 sq km in the central region), Sector X_1 (8,940 sq km in the central region), Sector X_2 (13,760 sq km in the western region), Sector VI_1 (46,267 sq km in the

/...

western region) and Sector VI_2 (48,361 sq km in the western region), with a total area of 132,328 sq km, should be designated as the reserved area;

(ii) That the area consisting of Sector III (52,300 sq km in the central region), Sector Y_1 (8,940 sq km in the central region) and Sector Y_2 (13,760 sq km in the western region), with a total of 75,000 sq km, should be designated as the pioneer area to be allocated to the applicant.

Notes

1/ The paragraphs referred to are in LOS/PCN/L.41/Rev.1, annex.

/...

Annex I

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

1. Mr. Samuel Sona Betah
Sub-Director of Geology
Ministry of Mines and Power
Yaoundé, Cameroon

2. Dr. Zhang Bingxi
Chairman, Advisory Committee for Science and Technology
Ministry of Geology and Mineral Resources
Beijing 100812, People's Republic of China

3. Dr. Alfredo José da Silva Netto
Assistant to the Directorate for Exploration and Production
PETROBRAS
Avenida República do Chile, 65, 23 Andar
Rio de Janeiro, RJ 20035
Brazil

4. Dr. Igor Sergeevich Gramberg
Director, Institute of Geology and Mineral Resources
of the World's Oceans
Ministry of Geology of the USSR
Moscow, USSR

5. Dr. Knut S. Heier
Director
Geological Survey of Norway
Leiv Eirikssons v. 39
PO Box 3006 Lade
N-7002 Trondheim
Norway

6. Mr. Takeshi Izumi
Director General
Overseas Activities Department
Metal Mining Agency of Japan
Tokiwa Building,
1-24-14, Toranomon, Minato-ku
Tokyo, Japan

7. Mr. Hicuunga H. E. Kambaila
Chief Inspector of Mines
Mines Safety Department
P.O. Box 21006
Kitwe, Republic of Zambia

/...

8. Mr. Naphtali Ndiritu Kamundia
Geologist, Government of Kenya
PO Box 30009
Nairobi, Kenya

9. M. Jean-Pierre Lenoble
Institut français de recherche pour l'exploitation de la mer (IFREMER)
Chargé de Mission "Nodules polymétalliques" auprès du Président Directeur Général
66 Avenue d'Iéna
75116 Paris, France

10. Dr. Alfonso López-Reina
Director de Investigaciones Científicas de la Universidad Militar de Colombia
Carrera 11, calle 100
Bogotá, Colombia

11. Mr. Sulaiman Zuhdi Pane
General Manager, Joint Operating Body (JOB)
Pertamina-Japex North Sumatra Ltd.
Skyline Building, 19th Floor
Jln. M.H. Thamrin No. 9
Jakarta-10340, Indonesia

12. Ing. Luis G. Preval Páez
Principal Specialist of the Production, Investments and Metallurgical Mining Development Division of the Ministry of Basic Industry
Havana, Cuba

13. Mr. David W. Pasho
Director, Ocean Mining Division
Mineral Policy Sector
Department of Energy, Mines and Resources
Ottawa, Canada

14. Dr. Bodo Schirmer
Special Representative of the Minister of Geology
Central Geological Institute
Invalidenstrasse 44
1040 Berlin
German Democratic Republic

15. Dr. T. R. P. Singh
Senior Manager
Engineers India Ltd.
R. K. Puram
New Delhi 110066
India

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.5
16 August 1989

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
New York, 14 August-1 September 1989

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION

CONTENTS

	Paragraphs	Page
LETTER OF TRANSMITTAL		104
INTRODUCTION	1 - 5	106
I. BASIC INFORMATION USED TO PREPARE THE EXPLORATION PLAN	6 - 8	107
A. Exploration plan for reserved areas in the central region of the North-East Pacific	6	107
B. Summary of data available	7 - 8	107
II. PREPARATORY WORK	9 - 15	107
A. Objective of the preparatory work	9	107
B. Activities and means to be employed	10 - 13	107
C. Output	14	109
D. Time and cost	15	109
III. REVIEW OF DATA AND INFORMATION BEFORE IMPLEMENTATION OF THE EXPLORATION PLAN	16 - 17	110
IV. STRUCTURE OF A SEA-BED MINING PROJECT	18 - 24	110

/...

CONTENTS (continued)

		Paragraphs	Page
	A. Context of the exploration plan	18 - 23	110
	B. Structure of the exploration plan	24	112
V.	DETAILS OF STAGE I	25 - 34	112
	A. Objective of the exploration	25	112
	B. Proposed activities and means to be employed	26 - 27	113
	C. Output	28	113
	D. Ship time, cost and period of exploration	29 - 34	114
VI.	REVIEW OF THE RESULTS OF STAGE I	35	114
VII.	DETAILS OF STAGE II	36 - 43	115
	A. Objective of exploration	36	115
	B. Proposed activities and means to be employed	37 - 38	115
	C. Output	39	116
	D. Ship time, cost and period of exploration	40 - 43	116
VIII.	SUMMARY	44 - 45	117
Annex.	Mandate of the Group of Technical Experts		118

/...

LETTER OF TRANSMITTAL

16 August 1989

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, were convened to prepare for the consideration of the Preparatory Commission a comprehensive plan for the early stages of exploration of one mine site in the area reserved for the Authority in the central region of the North-East Pacific, and also to prepare a comprehensive exploration plan from the first stages of exploration to the stage where a decision for exploitation could be taken.

The Group was also requested to assist the Preparatory Commission on matters relating to the training of personnel, taking into account the work done by the ad hoc working group on training in Special Commission 2. This matter is the subject of a separate report.

In examining its mandate, the Group concluded that the first stages of exploration would in fact form part of a comprehensive exploration plan from the first stages of exploration to the stage where a decision for exploitation could be taken. Accordingly, the Group proceeded to develop a complete plan for all stages of exploration providing such details of activities and costs as could be reasonably provided at this time. The Group has the honour to submit the plan in the attached report to the Preparatory Commission.

The Group met between 7 and 16 August at United Nations Headquarters and held 12 meetings concerning the exploration plan.

The Group would like to thank you and the Preparatory Commission for the opportunity to assist in the implementation of the obligations of the pioneer investors. The Group also wishes to draw your attention to the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and also thanks the secretariat of the Office of Ocean Affairs and the Law of the Sea for its assistance at our meetings.

Yours sincerely,

Signed in New York on 16 August 1989:

Alfredo José DA SILVA NETTO
(Brazil)

Mr. José Luis Jesus
Chairman of the Preparatory Commission
for the International Sea-Bed Authority
and for the International Tribunal
for the Law of the Sea
New York, N.Y.

/...

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)

Knut S. HEIER
(Norway)

Takeshi IZUMI
(Japan)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya) - absent

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

David W. PASHO
(Canada)

Luis G. PREVAL
(Cuba)

Bodo SCHIRMER
(German Democratic Republic)

T. R. P. SINGH
(India)

Samuel SONA BETAH
(Cameroon)

ZHANG Bingxi
(China)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission of the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was convened to prepare a comprehensive plan for the early stages of exploration of one mine site in the area reserved for the Authority in the central region of the North-East Pacific, indicating the nature of activities to be undertaken, the data and information to be obtained and the costs involved. It was also requested to prepare a comprehensive exploration plan from the first stages of exploration to the stage where a decision for exploitation could be taken. If it was not feasible to provide the same level of details and costings for the later stages of exploration, then the Group was required to give the reasons in its report.

2. In accordance with document LOS/PCN/L.41/Rev.1, annex, paragraph 4, in case of there being different opinions among its members, such opinion should be included in the report.

3. The Group commenced its work on 7 August 1989. The Special Representative briefed the Group on its mandate, copies of which were made available to all members (see the annex to the present report).

4. In examining its mandate, the Group concluded that the first plan of exploration requested would in fact form part of a comprehensive exploration plan from the first stages of exploration to the stage where a feasibility study could be undertaken in order to take a decision for exploitation. The work outlined in the comprehensive exploration plan would be a major part of a series of studies that would make up a research and development phase. The information provided by the research and development studies would be needed to take a decision as to whether to proceed with a feasibility study. Accordingly, the Group proceeded to develop the complete plan for all stages of exploration providing such details of activities and costs as could be reasonably provided at this time. The Group decided that, based on the data and information available following the registration of pioneer investors and designation of reserved areas, there were three steps necessary for completion of the exploration phase.

5. The first step required the compilation of all existing data in order to facilitate detailed planning and implementation of the first stage of exploration. The second step was the implementation of stage I of the exploration plan, at the end of which prime areas contained in the areas reserved for the Authority in the central region of the North-East Pacific would be identified. The last step was stage II, during which detailed exploration would be conducted in prime areas selected at the end of stage I, leading to identification of possible mine sites containing reserves for future mining.

I. BASIC INFORMATION USED TO PREPARE THE EXPLORATION PLAN

A. Exploration plan for reserved areas in the central region of the North-East Pacific

6. The central region consists of three blocks which are made up of six sectors that constitute a total area of 71,570 square kilometres, including the area of 52,300 square kilometres contributed by the pioneer investors (see figure 1). This region is situated in a structural zone striking WSW-ENE located between the Clarion fracture zone to the north and the Clipperton fracture zone to the south. It is considered an exceptional zone from the standpoint of the metal content and the high abundance of polymetallic nodule deposits.

B. Summary of data available

7. Data available to the Group were those previously submitted by the pioneer investors as part of their applications for registration. The data consisted of maps showing station locations, abundance (kilograms per square metre), metal content and bathymetry. In addition, listings of chemical composition, abundance and water depth were provided. The maps and listings were examined by the Group to prepare for the drawing up of an exploration plan.

8. The Group noted that there was a need to compile the data submitted by the various pioneer investors. The Group recommends that this preparatory work precede the implementation of the exploration plan.

II. PREPARATORY WORK

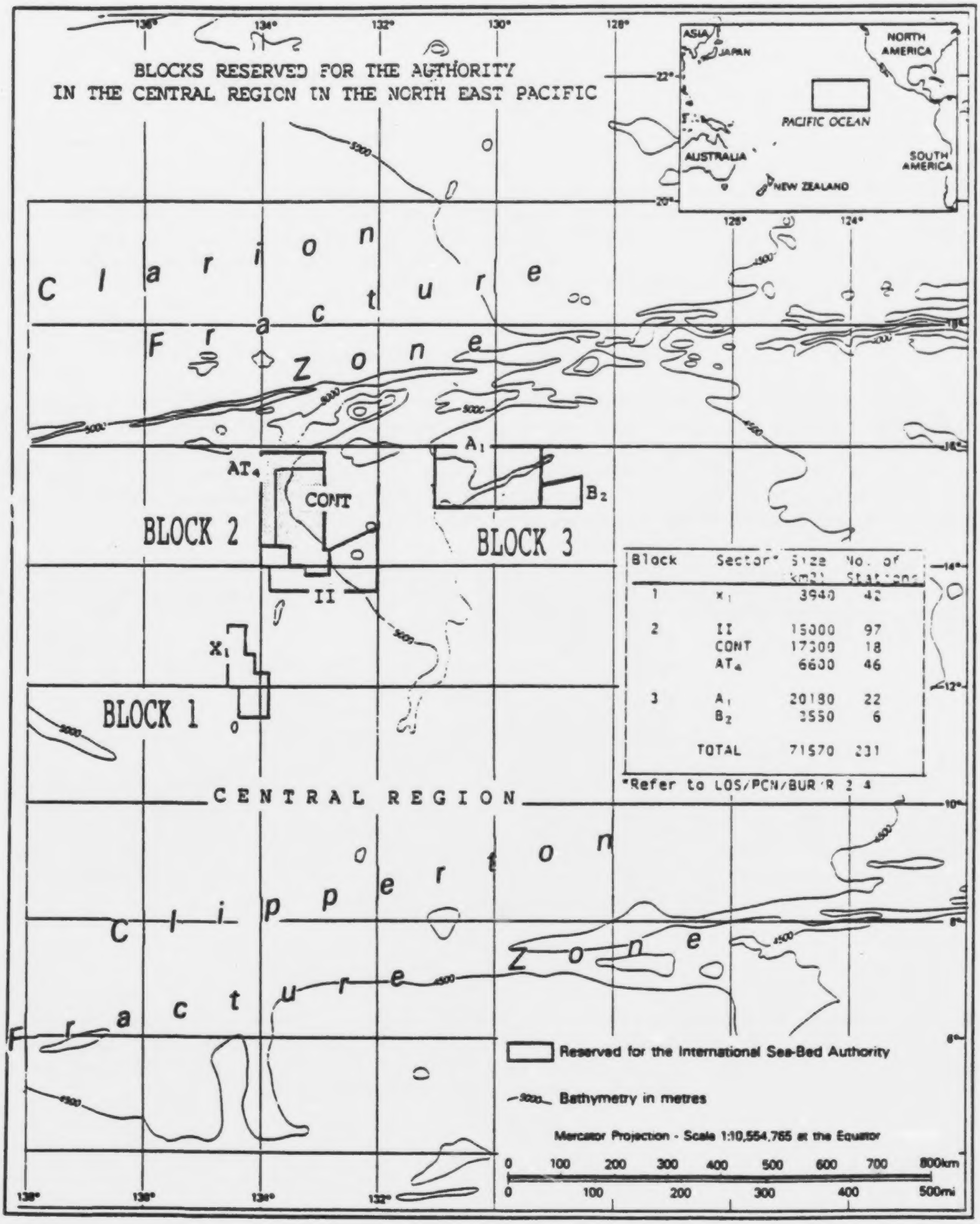
A. Objective of the preparatory work

9. It was considered necessary that the preparatory work should be done jointly by the three pioneer investors. The Office for Ocean Affairs and the Law of the Sea would facilitate the establishment of a data base. The objective of the preparatory work would be to compile and illustrate all the existing data in the Authority's areas in the central region in order to facilitate detailed planning and implementation of the first stage of the exploration plan.

B. Activities and means to be employed

10. Data would be compiled from a variety of sources. These would include data provided by the registered pioneer investors as well as data that might have been collected by individual pioneer investors in overlapping areas that were not part of the specific areas covered in their respective applications.

/...



Block	Sector*	Size (km^2)	No. of Stations
1	X_1	3940	42
2	II	15000	97
	CONT	17300	18
	AT_4	6600	46
3	A_1	20180	22
	B_2	3550	6
	TOTAL	71570	231

*Refer to LOS/PCN/BUR/R 24

Figure 1. Map showing blocks reserved for the Authority in the Central Region.

/...

11. A comprehensive computer data base for sample stations would be established. Data on station number, co-ordinates, depth, abundance, metal content, device and information on the source of the data would be entered. The data base would allow the raw data to be statistically manipulated and presented on various types of maps and graphs.

12. Bathymetric information from all the areas would also be compiled, including information collected by such means as precision depth recorders and multi-beam echo sounders.

13. Relevant information on nodule distribution, small-scale features and other information from photography and multi-frequency exploration system would be compiled.

C. Output

14. The output expected to come out of the preparatory work would include:

(a) Series of base maps:

(i) Index maps illustrating the location of all sample stations and track lines;

(ii) Bathymetric maps;

(iii) Grade maps showing the metal content;

(iv) Abundance maps;

(v) Accumulation maps (composite of metal and abundance);

(b) Series of interpreted maps that could serve as a basis for the preliminary identification of those parts of the area that might be of particular interest;

(c) Computerized data base for samples.

D. Time and cost

15. The Group estimated that the preparatory work, including compilation, manipulation and interpretation of data to be done jointly by the three pioneer investors, would take approximately six months and would cost in the order of $US 150,000.

/...

III. REVIEW OF DATA AND INFORMATION BEFORE IMPLEMENTATION OF THE EXPLORATION PLAN

16. The Group has set out an exploration plan in two stages in the following sections of the present report. Stage I of the exploration plan does not, at this time, include a detailed operational schedule. Such a schedule would include specific track lines, sampling stations, laboratory tests, volume of work and sequencing of various activities. This would not be developed before the preparatory work was completed.

17. Following the completion of the preparatory work, a technical review of the results would have to be undertaken prior to the implementation of stage I of the exploration plan.

IV. STRUCTURE OF A SEA-BED MINING PROJECT

A. Context of the exploration plan

18. The exploration plan should be considered in the context of the overall structure of a sea-bed mining project (see figure 2).

19. A deep sea-bed mining project could be divided into five periods:

(a) The early period of first approaches and prospecting which had led the pioneer investors to apply for a pioneer area;

(b) The research and development period, during which the mining and processing technology was tested and exploration activities undertaken to identify possible mining sites. When the technologies were considered appropriate and when adequate mining sites were identified and the marketing environment appears attractive, a decision to proceed to a feasibility study would be taken;

(c) The feasibility study would have to verify that the identified mining sites were mineable with the existing technologies and that the cost of mining and processing was balanced by the revenues that could be expected from selling the final products. If the result of the investigation was positive, then a decision to start would be taken. If not, further studies would be undertaken unless it was decided to await better economic conditions;

(d) If it was decided to start, the construction of the mining system and the processing plant would follow. During this period the first mining fields would be further explored in order to map all the obstacles in detail and to define the mining tracks;

(e) During the commercial production, the detailed exploration of future mining fields would continue one to two years in advance of mining in those fields.

/...

	EARLY PERIOD	RESEARCH & DEVELOPMENT	FEASIBILITY STUDY	CONSTRUCTION	PRODUCTION
Possible Duration----------------->		(7-10 years)	(2-3 years)	(4-6 years)	
EXPLORATION	Prospecting	Exploration Stages I & II __ .	Reserves ____ .	Mine preparation----------------->	
MINING	Concepts	Pilot tests __.	Further tests ?__.	Mining Equipment	Start up-------->
PROCESSING	Approacnes	Pilot plant __.	Further tests ?__.	Processing plant	
MARKETING	Products	Supply/Demand__.	Update __.	Sales contracts--------------->	
FINANCIAL		Analysis__.	Analysis__.	Monitoring------------------->	
MANAGEMENT		Decision to proceed	Decision to start	On-going decisions------>	

Figure 2: Structure of a sea-bed mining project

/...

20. The duration given in figure 2 for each period can only be considered indicative. In the opinion of the Group, the lower figures must be considered as a minimum. As far as the research and development period was concerned, the duration would be mainly determined by the time needed for the testing of mining and processing technologies.

21. The Group considered that the exploration plan as developed in the present report would be completed at the end of the research and development period. At that point, the possible mining sites would have been identified and the results of the work done would constitute a valuable basis for a feasibility study, which would be a key stage leading to the decision for exploitation.

22. A mining site was defined as a group of nodule fields that can be economically mined and processed with the available technology. The requirements would be defined in terms of topography, nodule abundance, metal content of the nodules, soil mechanics properties, etc. It is likely that the requirements would be modified during the course of the mining and processing technology developments. The exploration activities would have to be adjusted from time to time to meet the new requirements.

23. The Group pointed out that simply adding the time ranges estimated for individual periods would not provide a realistic estimate of the total time needed to begin commercial production. Depending upon the status of technology, and market and financial conditions, decisions to delay the commencement of the feasibility study or to delay the start of commercial production might add more time to the overall project schedule.

B. Structure of the exploration plan

24. The Group suggested that the exploration plan be broken down into two stages:

(a) Stage I would be designed to provide additional information on the total area and to establish a uniform data base to allow identification of prime areas;

(b) Stage II would be designed, through evaluation of the results of stage I, to undertake detailed survey activities to identify possible mining sites and the reserves that could be mined.

V. DETAILS OF STAGE I

A. Objective of the exploration

25. The objective of the exploration during stage I would be to delineate the best areas for detailed exploration. From the total area of 71,570 square kilometres in the central region reserved for the Authority, it was estimated that the areas selected for detailed exploration, as a result of work during that stage, might be

/...

in the order of 50 per cent of the total area to be covered during stage I. The actual size of the selected prime areas would, however, depend on the results of exploration at stage I.

B. Proposed activities and means to be employed

26. The exploration plan would be based on the current state-of-the-art technology. This would include the relevant technologies needed: (a) to produce detailed continuous bathymetry of the area; (b) to produce continuous profiles showing distribution of nodule abundance; and (c) to recover samples of nodules for determination of abundance and metal grades. Meteorological, oceanographic and environmental data would also be compiled. Specific systems and methods of work would be determined upon the completion of the preparatory work jointly by the three pioneer investors.

27. The work would require the use of:

(a) Multi-beam echo sounding systems to collect bathymetric data over the total area;

(b) Multi-acoustic systems to determine the distribution of nodule abundance along continuous profiles for the areas where this method had not already been used;

(c) Bottom sampling and spot photography at a grid of 15 kilometres x 15 kilometres;

(d) Measurements of abundance (in kilograms per square metre) and determinations of metal content (Mn, Fe, Ni, Cu, Co) and moisture content for all samples collected. Ten per cent of these samples would also be analysed for additional elements such as Si, Al, Ca and Mg.

C. Output

28. The output of the exploration would include:

(a) Documentation, including all exploration data collected during stage I;

(b) Interpretation and synthesis of all data generated during the exploration including bathymetric, abundance and metal content maps;

(c) Compilation of available meteorological, oceanographic and environmental data collected during this stage and obtained additionally from the pioneer investors as well as from various international sources;

(d) Recommendations on:

(i) Prime areas for detailed exploration;

/...

(ii) The minimum requirements (criteria) to be used for identification of possible mine sites.

D. Ship time, cost and period of exploration

29. Based on the activities proposed in the earlier section, the ship time required to complete each activity was estimated and is summarized below:

Activity	Approximate ship time (months)
Bathymetric mapping	2 1/2
Nodule abundance mapping	2
Sampling and spot photography	1
Total	5 1/2

30. The total ship time (cruise period) would thus work out to five-and-one-half months or say five to six months. The total time was rounded off to five to six months since, in practice, each cruise would be planned for one month.

31. In addition to the cruise time, analytical and data-processing work would be required to be done on land.

32. The area over which multi-acoustic surveys would be conducted would be reduced to take into account the results of such surveys already conducted in certain areas and for which data would be made available before the implementation of stage I.

33. The total cost for stage I of the exploration was estimated as $US 7 million to $US 9 million (1989 basis). The estimate included cost allowances for ship time, laboratory tests, data-processing facilities, analysis and other associated work.

34. It was estimated that the exploration plan for stage I might take two to three years to be completed since the surveys would not in practice be conducted continuously throughout the year. The surveys would be of diverse nature and might be done by different operators.

VI. REVIEW OF THE RESULTS OF STAGE I

35. The comprehensive report containing all the data and results obtained during stage I along with recommendations would be submitted for a technical review

/...

following which the decision would be taken as to whether and when to undertake detailed exploration for stage II.

VII. DETAILS OF STAGE II

A. Objective of the exploration

36. The objective of the exploration during stage II would be to conduct a detailed exploration in the prime areas selected at the end of stage I leading to the identification of possible mining sites, and the reserves that could be mined.

B. Proposed activities and means to be employed

37. The exploration plan would be based on the current state-of-the-art technology. This would include means for determining microtopography, continuous mapping of the sea-bed for nodule distribution, more refined sampling, geotechnical studies of nodules and associated sediments and for generating baseline oceanographic and environmental data. The proposed grids and spacings for various surveys would be based on the present understanding and would be subject to review as more information became available.

38. The activities and means proposed would include:

(a) Additional bottom sampling and spot photography using free-fall devices to cover an average grid of 15 kilometres x 7.5 kilometres in prime areas;

(b) Bottom sampling using box coring device at an average grid of 15 kilometres x 15 kilometres in some areas;

(c) High resolution acoustic systems such as side scan sonar for mapping microtopography of the sea-bed at an average spacing of 10 kilometres for the prime areas;

(d) Continuous photography and/or television systems for showing distribution of nodules (population) on the sea-bed at an average spacing of 10 kilometres for the prime areas;

(e) Geotechnical studies in specifically selected areas, including:

(i) Determination of physical and mechanical properties of nodules and sediments from the samples collected using box corers;

(ii) Interpretation of data from side scan sonar and sub-bottom profiler data or other high resolution acoustic system;

(iii) *In situ* testing of geotechnical properties of the sediments;

(f) Oceanographic and baseline environmental studies using:

(i) Oceanographic (physical, chemical and biological) data of a general as well as of a site specific nature using standard techniques;

(ii) Biological data from samples and photographs.

C. Output

39. The output of exploration would include:

(a) Documentation including all exploration data collected during stage II;

(b) Interpretation and synthesis of all data generated during the exploration in the form of appropriate maps, diagrams and tables;

(c) Evaluation of tonnages and grades meeting relevant criteria and their spatial distribution;

(d) Compilation of all oceanographic data collected;

(e) Recommendations on possible mining sites in relation to the criteria used for their identification.

D. Ship time, cost and period of exploration

40. For all the activities envisaged during this stage, an estimate of the ship time (cruise period) was made for various types of activities, as summarized below:

Activity	Approximate ship time (months)
High resolution acoustic system such as side scan sonar and continuous photography and/or television system using near bottom devices	13-14
Sampling using free-fall devices and box corers	2-3
Oceanographic, geotechnical and additional studies	5-6
Total	20-23

41. The total cost for all work associated with stage II was estimated at about $US 35 to $US 40 million (1989 basis).

/...

42. As illustrated in figure 2, the activities envisaged would be spread over several years. Further, the period over which the various activities of exploration at stage II would actually be scheduled and completed would be determined taking into account the future developments in exploration, mining and processing technologies.

43. On the basis of the current available technology, exploration at stage II would be time-consuming and consequently expensive. The Group believed that the current technology, particularly that used for continuous measurement of nodule abundance, might not be accurate enough to identify mining sites that would be required to meet precise criteria. Consequently, further research to develop more accurate and efficient exploration technology was recommended.

VIII. SUMMARY

44. The preparatory work preceding exploration would take about six months and would cost in the order of $US 150,000.

45. The exploration plan proposed by the Group would provide for two separate stages of work:

(a) Stage I would identify the prime areas contained in the areas reserved for the Authority in the central region of the North-East Pacific. The work would take about two to three years to complete and would cost approximately $US 7 million-$US 9 million;

(b) As currently envisaged, stage II would entail several years of detailed surveys to identify possible mining sites and would cost in the order of $US 35 million-$US 40 million;

(c) The time and cost particularly of stage II, could vary depending on the results of prior work and advances in exploration technology. The cost estimates provided in the present report were based on information provided by the members of the Group who had experience in this field. The cost estimates were considered reasonable but would be revised as more information and experience were gained.

/...

Annex

MANDATE OF THE GROUP OF TECHNICAL EXPERTS

A

1. (a) In order to assist the Preparatory Commission in the implementation of obligations of the pioneer investors as set forth in resolution II and in document LOS/PCN/L.41/Rev.1, annex, paragraph 14, the Group of Technical Experts shall prepare for the consideration of the Preparatory Commission a comprehensive plan for the early stages of exploration of one mine site in the area reserved for the Authority in the central zone of the North-East Pacific, with an estimate of the costs involved;

(b) For this purpose, the Group shall review the data and information submitted for the relevant areas by the pioneer investors with their respective applications for registration and deposited with the Secretary-General;

(c) The plan of exploration shall, *inter alia*, include:

(i) The nature of the activities to be undertaken;

(ii) The data and information to be obtained;

(iii) The costs involved at each stage.

2. In order to facilitate the deliberations of the Preparatory Commission, the Group shall also prepare a comprehensive exploration plan from the first stages of exploration to the stage where a decision for exploitation can be taken. However, if it is not feasible to provide the same level of details and costing for the later stages of exploration then the Group would give reasons for this in its report.

3. Upon completion of its work relating to the exploration referred to above, the Group will be available to assist on matters relating to the training of personnel, taking into account the work done by the *Ad Hoc* Working Group on Training in Special Commission 2.

B

The Group of Technical Experts constituted under the annex to the statement on the implementation of resolution II (LOS/PCN/L.41/Rev.1) shall be convened prior to the next meeting of the Preparatory Commission. The travel costs and per diem of the members of the Group and costs for miscellaneous supplies and material required by the Group shall be paid out of the special account established for the Preparatory Commission for the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea from the registration fees paid by the four pioneer investors.

/...

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.5/Corr.1
26 October 1989

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
New York, 14 August-1 September 1989

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION

Corrigendum

Page 7, table inset to map:

For the existing text substitute

Block	Sector*	Size (km^2)	No. of stations
1	x_1	8 940	42
2	II	15 000	97
	CONT	17 300	46
	AT_4	6 600	18
3	A_1	20 180	22
	B_2	3 550	6
	TOTAL	71 570	231

* Refer to LOS/PCN/BUR/R.2-4.

/...

Distr.
RESTRICTED

LOS/PCN/BUR/R.7
23 January 1991

ORIGINAL: ENGLISH

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Ninth session
Kingston, Jamaica
25 February-22 March 1991

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEA-BED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

	Paragraphs	Page
LETTER OF TRANSMITTAL		121
INTRODUCTION	1 - 3	123
I. BASIC INFORMATION REGARDING THE APPLICATION		124
II. EXAMINATION OF THE TECHNICAL DATA AND INFORMATION TO DETERMINE WHETHER BOTH PARTS OF THE APPLICATION AREA ARE OF EQUAL ESTIMATED COMMERCIAL VALUE	4 - 32	127
III. CONCLUSIONS	33	134

Annexes

I. List of members of the Group of Technical Experts		135
II. List of co-ordinates of areas*		

---

* Confidential. Deposited with the Secretary-General.

/...

LETTER OF TRANSMITTAL

14 December 1990

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application of the Government of the People's Republic of China for registration as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts has undertaken an examination of the application in accordance with its mandate and the attached report which was unanimously adopted contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 10 and 14 December 1990, during which period the Group held nine sessions.

We regret that two members of the Group, Mr. Igor Sergeevich Gramberg (Union of Soviet Socialist Republics) and Mr. Naphtali Ndiritu Kamundia (Kenya), were unable to attend the meeting. The Group wishes to express its appreciation for the co-operation of the representatives of the applicant, the Government of the People's Republic of China.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist on the matter of registration of the People's Republic of China. The Group also wishes to draw to your attention the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the secretariat of the Office for Ocean Affairs and the Law of the Sea in providing assistance throughout the meetings.

Yours sincerely,

Signed in New York on 14 December 1990:

Alfredo José DA SILVA NETTO
(Brazil)

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)
(absent)

Mr. José Luis Jesus
Chairman of the Preparatory Commission
for the International Sea-Bed Authority
and for the International Tribunal for
the Law of the Sea
New York, New York

/...

Knut S. HEIER
(Norway)

Takeshi IZUMI
(Japan)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya) (absent)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

David W. PASHO
(Canada)

Luis G. PREVAL PAEZ
(Cuba)

Bodo SCHIRMER
(Germany)

T. R. P. SINGH
(India)

Samuel SONA BETAH
(Cameroon)

ZHANG Bingxi
(China)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission for the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was mandated to determine whether applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the statement of understanding of 5 September 1986 and the statement of understanding of 10 April 1987 (LOS/PCN/L.43/Rev.1) and to submit a report on each application to the General Committee. The Group noted that in case of there being different opinions among its members, such opinions shall be included in the report (LOS/PCN/L.41/Rev.1, annex, para. 4). 1/

2. In accordance with the relevant decision of the Preparatory Commission, the application of the People's Republic of China was examined to ensure whether it was in conformity with resolution II taking into account that the People's Republic of China, "like other applicants, if it so wishes, will identify in its application area, an area totalling 52,300 square kilometres for incorporation in the area of up to 150,000 square kilometres to be allocated to it as a pioneer area. The provisions on relinquishment in resolution II, paragraph 1 (e), shall apply to the allocated area." 2/

3. The Group of Technical Experts held its initial meeting on the morning of 10 December 1990. The Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, briefed the Group on its mandate and outlined the specific procedures that would be in effect to ensure the confidentiality of the data and information contained in the application of the People's Republic of China. The application of the People's Republic of China was then opened in the presence of the representative of the applicant. Mr. Chen Bingxin, head of the Chinese delegation, introduced the application, which the Group proceeded to examine immediately. The Group met each day in morning and afternoon sessions from 10 to 14 December 1990.

1/ Paragraph 4 of the statement on the implementation of resolution II, contained in the annex to document LOS/PCN/L.41/Rev.1.

2/ Paragraph 13 (3) of the statement on the implementation of resolution II, contained in the annex to document LOS/PCN/L.41/Rev.1.

/...

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the applicant

1. Name of State(s) or certifying State(s):

The People's Republic of China

2. Date of Signature of the Convention by the certifying State or States:

10 December 1982

3. Applicant:

a. Name China Ocean Mineral Resources Research and Development Association (COMRA)

b. Mailing Address
1 Fuxingmenwai Ave.
Beijing 100860, China

c. Telephone Number (01) 867283
Telex Address 22536 NBO CN

d. Name of Designated Representative or Designated Authority Mr. Wang Jianwen

e. Mailing Addresses
1 Fuxingmenwai Ave.
Beijing 100860, China

f. Telex Address 22536 NBO CN

/...

4. Status of the applicant under resolution II, paragraph (1) (a) (i):

State ☒

State enterprise ☐

Natural or juridical person ☐

5. Certificate of registration as a juridical person (if applicable):

Submitted: Yes ☐ No ☐

Not Applicable: ☒

6. Date of receipt of application: 22 August 1990

B. Data submitted by the applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Co-ordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances that the application area is located beyond the limits of national jurisdiction of any State

Submitted: Yes ☒ No ☐

/...

6. Assurances of compliance with the provisions of resolution II and the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1)

Submitted: Yes ☒ No ☐

C. Payment of Fee:

The applicant agrees to make the payment of $US 250,000 as the fee for registration as a pioneer investor and for the allocation of a pioneer area as soon as the applicant is advised by the Preparatory Commission.

/...

II. EXAMINATION OF THE TECHNICAL DATA AND INFORMATION TO DETERMINE WHETHER BOTH PARTS OF THE APPLICATION AREA ARE OF EQUAL ESTIMATED COMMERCIAL VALUE

A. Proposals

4. The initial presentation identified an area of 300,000 square kilometres that was subdivided into an area of 150,000 square kilometres to be contributed to the Authority as a reserved area, an area of 97,700 square kilometres to be allocated to the applicant as a pioneer area and an area of 52,300 square kilometres identified to be retained by the applicant. The Group made a thorough analysis of the proposal and concluded that the areas proposed for the Authority and the applicant were well balanced and of equal estimated commercial value. However, the Group noted that the application was in essence a proposed allocation of areas rather than a presentation of areas whereby the General Committee could make a selection between alternatives.

5. The applicant was asked to make a second proposal that would allow a meaningful choice by the General Committee between an area to be reserved for the Authority and an area to be allocated to the applicant. Accordingly, the applicant provided a second proposal that met the requirements.

B. Data submitted

6. The application of China identifies a total area of 300,000 square kilometres in the Clarion-Clipperton Zone of the Pacific Ocean. In the second proposal, it is divided into four areas: Area A, of 52,300 square kilometres, consists of four sectors; Area B, of 97,700 square kilometres, consists of five sectors; Area C, of 97,700 square kilometres, consists of two sectors; Area S, of 52,300 square kilometres, consists of three sectors, which was identified by the applicant for incorporation into the pioneer area to be allocated to the applicant in accordance with paragraph 13 (3) of LOS/PCN/L.41/Rev.1 of 5 September 1986. Figure 1 shows the disposition of sectors in the areas.

7. The following technical documents were included in the application:

(a) Maps:

(i) Overview map of locations of the application area of China;

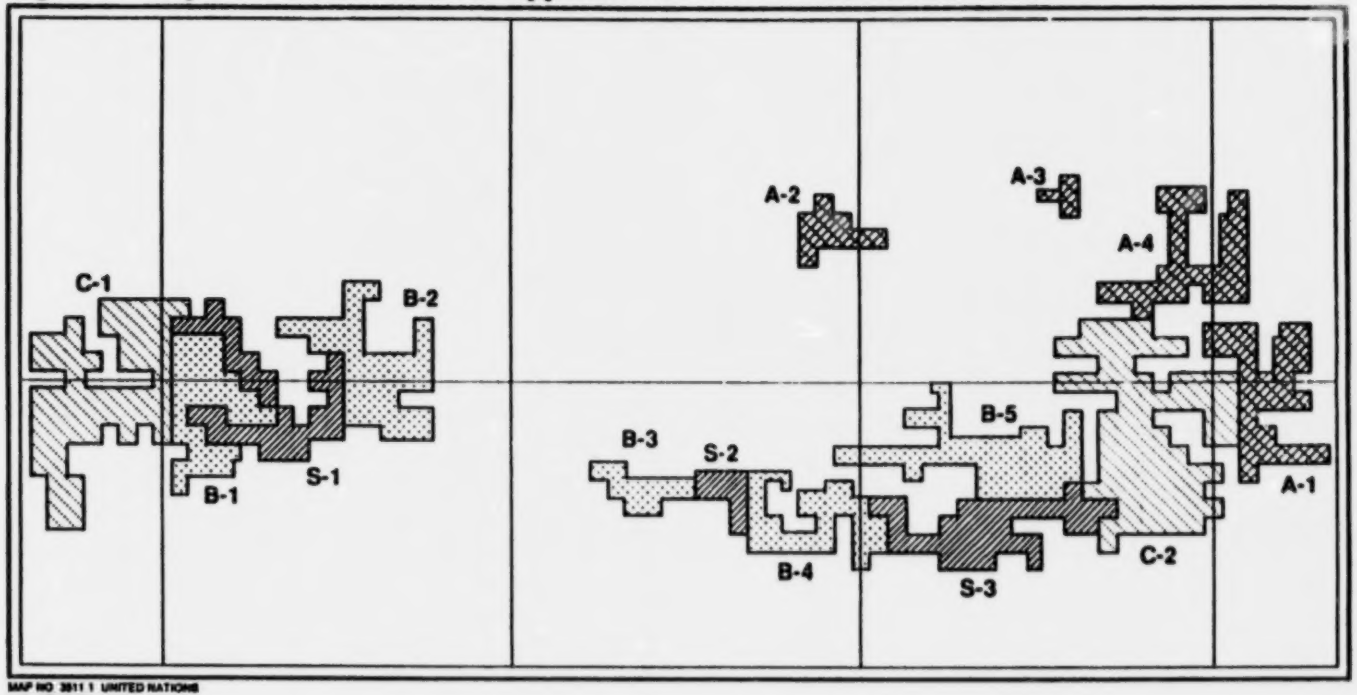
(ii) Disposition of sectors in the application area of China;

(iii) Sea-bed topographic maps (5) of the application area of China;

(iv) Maps (5) indicating the distribution of sample locations, grade and abundance of polymetallic nodules in the application area of China.

/...

Figure 1. Disposition of Sectors in the Application of China (North Pacific Ocean)



MAP NO 3811 1 UNITED NATIONS
JANUARY 1991

(b) Tables:

Table 1: Co-ordinates of turning-points of the application area of China (12 pages);

Table 2: Statistics of the amount of polymetallic nodule resources in the application area of China (2 pages);

Table 3: Co-ordinates, metal contents and abundance of polymetallic nodules, and water depths of various stations in the application area of China (13 pages);

Table 4: Survey equipment and analytical instruments (2 pages).

8. Additional technical details were given by the applicant in response to questions by the members of the Group of Experts.

9. Additional material was provided by the applicant on the following:

(a) Maps:

Disposition of sectors in the application area of China;

(b) Tables:

Table 5: Statistics of the amounts of polymetallic nodule resources in the application area of China (2 pages);

Table 6: Co-ordinates of turning-points of the application area of China (12 pages).

10. All technical data submitted in the application have been gathered using standard and recognized methods.

C. Methodology

1. General

11. The Group used a number of indicators that have proved useful in assessing equal estimated commercial value. As with previous applications, it was recognized that any approach should be based on the fact that the data reflect the prospecting or exploration stage and that they should be based on a relative comparison of the two areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

12. The most important factors were considered to be the metal content, nodule abundance and bathymetry. Because the complex relationship between these factors makes it impossible to make a comparative assessment on the basis of one single composite indicator, several indicators were used in order to ensure comprehensive

/...

consideration of the variety of factors that might now, or in the foreseeable future, have a major effect on the relative commercial values of the two areas.

13. As with previous applications, the Group, comprising experts in various disciplines, adopted a set of criteria and an approach that centred essentially on technical aspects.

14. Taking into account the relevant provisions contained in resolution II regarding mapping, sampling, abundance of nodules and their metal content, the Group used its established procedure for a thorough examination of every factor mentioned above.

15. In order to accomplish this task, the Group divided itself into five teams, as follows: the first carried out a comprehensive study of nickel; the second, manganese; the third, cobalt; the fourth, the abundance and tonnage of nodules; and the fifth, an examination of the sea-bed topography.

2. Metal content

16. The Group evaluated the relative amounts of nickel, cobalt and manganese metal contained in the nodules from each area. The basic information used to make this comparison was developed by calculating the metal accumulation, taken as the per cent metal times the nodule abundance at each of some 400 stations. These values, together with per cent metal, were plotted on charts in order to evaluate the relative distribution and trends in various areas. This procedure was carried out for each individual metal and used to determine whether one or the other area contained either larger areas of higher grade nodules and/or greater quantity of contained metals.

17. An additional analysis was made of the cumulative frequency distribution of the metal accumulations in Areas A, B, C and S. This was done in order to assess possible differences that might not be reflected in the data on the mean value of metals in the areas.

3. Abundance

18. The data on abundance given for each station were used to verify the average abundance and the tonnage of nodules as well as their range of variation at 95 per cent confidence level in all the individual sectors. The cumulative frequency distribution was determined for each sector and combined for the different areas to assess possible differences.

4. Bathymetry and geomorphology

19. The examination of geomorphological and tectonic features of the application area was carried out by checking and comparing all topographical maps and information provided by the applicant. The nature of the data available at this

stage of prospecting and on a scale of 1:1,000,000 allows only a regional comparison of the areas. The regional comparison was carried out on the basis of data and information on the water depth, geomorphology and structural alignment. The evaluation also focused on geomorphological features such as slope angles, general geomorphology of the sea-bottom and the frequency and distribution of recognizable geomorphological features. The relief and bathymetric features that might affect exploration and exploitation were also considered. The process recognizes the relative nature of the comparisons since the data and information are taken from a general bathymetric chart of the applicant.

D. Results of the evaluation

1. Adequacy of data

20. The Group reviewed the type, frequency and spatial distribution of the data and concluded that they were adequate for developing information that could be used to assess two areas of equal estimated commercial value. The data are also adequate to show that the areas have similar technical characteristics which make them worthy of further exploration in order to delineate possible mine sites.

21. The Group agreed that the areas are distributed such that the hydrological and meteorological conditions of the two areas may be considered similar.

2. Metal content

22. The Group carried out an evaluation of nickel, cobalt and manganese in the areas. It was decided not to develop separate information on copper in view of the well-established relationship between copper and nickel that allows the characteristics of copper to be closely approximated by the analysis of nickel.

23. Nickel. In the case of nickel, an evaluation of the mean values of nickel and nickel accumulations and their statistical distributions in Areas B and C revealed Area C to be marginally better than Area B. Further evaluation also suggested that the combination of Areas S and B was very similar to the combination of Areas C and A in terms of nickel grades as well as nickel accumulations. In contrast, the combination of Areas S and C represented a slightly higher value than the combination of Areas A and B.

24. Manganese. Manganese was considered with respect to per cent metal content as well as accumulations in terms of statistical as well as spatial distributions. The analysis of data led to the conclusions identical to those obtained for nickel.

25. Cobalt. The spatial distribution of cobalt accumulation was found to be more consistent in the western part of the application area than in the eastern part. The statistical distribution of cobalt values suggested that Areas B and C were very similar to each other. Further, the combination of Areas S and B has cobalt values similar to the combination of Areas A and C.

/...

3. Abundance and tonnage

26. The results of the calculation of both abundance and tonnage correspond with the information given in the application and with the additional information provided by the applicant. They suggested that Areas (S and B) and (A and C) are similar as far as those indicators are concerned. This was confirmed by the fact that cumulative distribution of abundance in the two areas shows statistical similarity.

4. Bathymetry and geomorphology

27. The bathymetric and geomorphological analyses of the areas have revealed that in general the bathymetry and geomorphology are comparable in the different sectors of the application area. The sea-bottom in the application area is slightly hilly and characterized by irregularly distributed seamounts. In general, the slopes of these seamounts do not exceed 4 degrees, except for some structures in the western part of the application area, where slopes may reach 10 degrees or more.

28. The general directions of the first- and second-order structures are mainly ENE-WSW and NE-SW. E-W structures in the western part and NNW-SSE structures in the central part are additional features. In the eastern part, a plateau-like complex with some small basins prevails. The frequency of the seamounts is slightly higher in the western part of the application area.

29. The group concluded that, when all factors are considered, the sea-bottom topography in different sectors of the application areas is essentially similar.

30. Water depth in the western part is generally greater than in the eastern part by approximately 10 per cent.

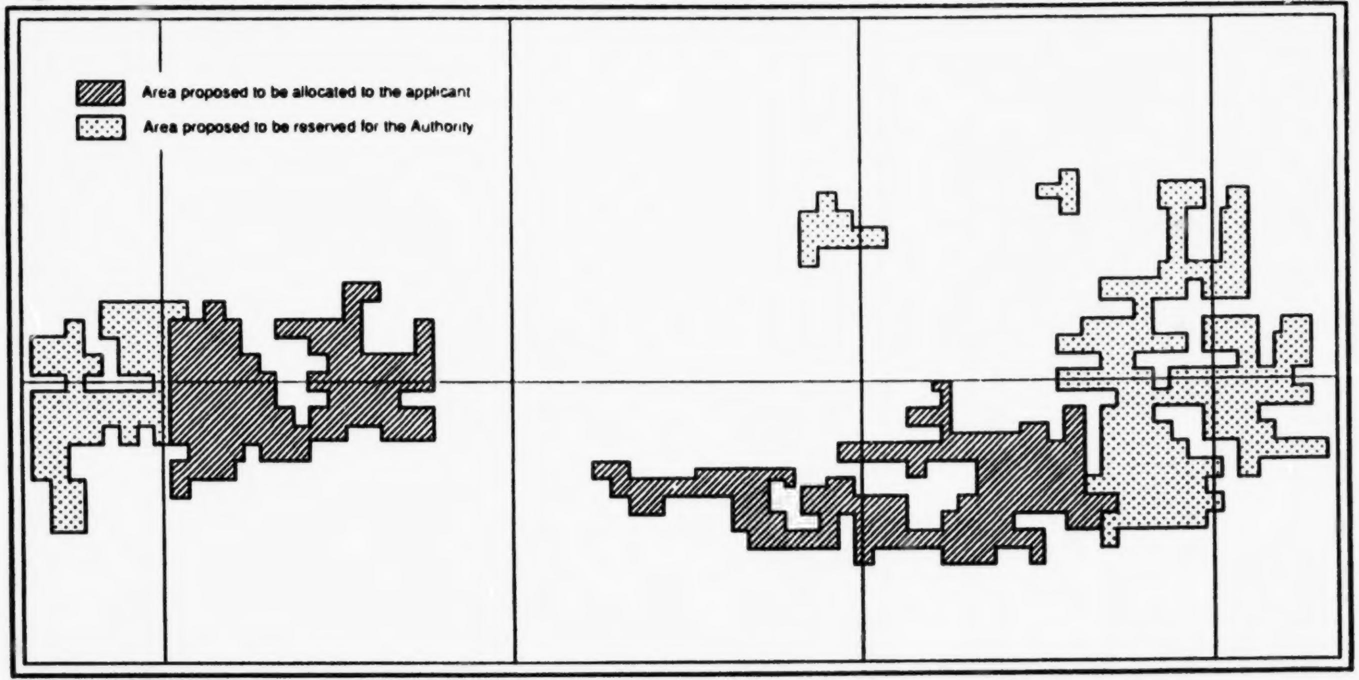
E. Selection of areas

31. In the light of the evaluations made above, the Group proceeded to consider the selection of one of the two Areas B or C to be incorporated into the area to be allocated to the applicant, and into the area to be reserved for the Authority. It was concluded that the combination of Areas B with S and the combination of Areas C with A are of equal commercial value. Each of these combinations will make an area of 150,000 square kilometres.

32. The co-ordinates of Areas (S and B) and (A and C) have been determined by the Group of Technical Experts and are contained in a sealed envelope deposited with the Secretary-General of the United Nations. Figure 2 shows the proposed disposition of areas.

/...

Figure 2. Disposition of Areas in the Application of China (North Pacific Ocean)


▨ Area proposed to be allocated to the applicant
░ Area proposed to be reserved for the Authority

MAP NO. 3511.2 UNITED NATIONS
JANUARY 1991

/...

III. CONCLUSIONS

33. The following conclusions were reached unanimously by the Group.

(a) Having examined the particulars submitted by the applicant, which are summarized in part I of the present report, the Group has concluded that the application has been submitted in accordance with resolution II and the understanding contained in document LOS/PCN/L.41/Rev.1.

(b) Having evaluated the technical data and information submitted by the applicant as referred to in part II of the present report, the Group determined that Areas (S and B) and (A and C) are of equal estimated commercial value.

(c) As regards the designation of the reserved area and the allocation of the pioneer area, the Group agreed to recommend for the consideration of the General Committee:

(i) That Area (A and C) should be designated as the area to be reserved for the Authority;

(ii) That Area (S and B), which includes an Area S of 52,300 square kilometres identified by the applicant, should be designated as the pioneer area to be allocated to the applicant.

/...

Annex I

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

1. Dr. Alfredo José da Silva Netto
   Praia do Flamengo 60 - Apto. 901
   Rio de Janeiro, RJ
   Brazil

2. Dr. Igor Sergeevich Gramberg
   Director, All-Union Research
   Institute of Geology and Mineral Resources of the World's Ocean
     (VNII Okeanogeologiya)
   Ministry of Geology of the USSR
   Moscow, USSR

3. Dr. Knut S. Heier
   Managing Director
   Geological Survey of Norway
   Leiv Eirikssons vei 39
   PO Box 3006 Lade
   N-7040 Trondheim
   Norway

4. Mr. Takeshi Izumi
   Project Manager of JICA Expert Team
   Metal Working and Machinery Industries Development Institute
   Soi Trimit Kluaynamthai Rama 4 Rd.
   Phrakanong, Bangkok 10110
   Thailand

5. Mr. Hicuunga H. E. Kambaila
   Chief Inspector of Mines
   Mines Safety Department
   P.O. Box 21006
   Kitwe, Zambia

6. Mr. Naphtali Ndiritu Kamundia
   Geologist, Government of Kenya
   P.O. Box 30009
   Nairobi, Kenya

7. M. Jean-Pierre Lenoble
   Institut français de recherche pour l'exploitation de la mer (IFREMER)
   155 rue Jean-Jacques Rousseau
   92138 Issy les Moulineaux Cedex
   France

/...

8. Dr. Alfonso López-Reina
Director de Investigaciones Cientificas de la Universidad Militar de Colombia
Carrera, 11, No. 101-80
Bogotá, Colombia

9. Mr. Sulaiman Zuhdi Pane
Pimpinan Umum Daerah (Area General Manager)
Pertamina, Sumatera Selatan
Plaju, 30268
Indonesia

10. Mr. David W. Pasho
Director, Ocean Mining Division
Mineral Policy Sector
Department of Energy, Mines and Resources
460 O'Connor Street, 11th floor
Ottawa, Canada

11. Ing. Luis G. Preval Paez
Principal Engineer for the Nickel Industry
Ministry of Basic Industry
Avenida Salvador Allende 666
Havana 3, Cuba

12. Dr. Bodo Schirmer
Bundesanstalt für Geowissenschaften und Rohstoffe
Invalidenstr. 44
0-1040 Berlin
Germany

13. Dr. T. R. P. Singh
Deputy General Manager
Engineers India Ltd.
R.K. Puram
New Delhi 110066
India

14. Mr. Samuel Sona Betah
Director of Geology
Ministry of Mines and Power
Yaounde, Cameroon

15. Dr. Zhang Bingxi
Director, Higher Advisory Centre for Science and Technology
Ministry of Geology and Mineral Resources
No. 64, Funeidajie
Xisi, Beijing
China

/...

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.7/Corr.1
27 February 1991

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEA-BED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Ninth session
Kingston, Jamaica
25 February-22 March 1991

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEA-BED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

Corrigendum

Page 6, paragraph 4

For the existing text substitute

4. Status of the applicant under resolution II, paragraph (1) (a) (iii):

State	☐
State enterprise	☒
Natural or juridical person	☐

/...

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.8
2 August 1991

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
New York, 12-30 August 1991

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENTS OF THE REPUBLIC OF BULGARIA, THE REPUBLIC OF CUBA, THE CZECH AND SLOVAK FEDERAL REPUBLIC, THE REPUBLIC OF POLAND AND THE UNION OF SOVIET SOCIALIST REPUBLICS FOR REGISTRATION OF THE INTEROCEANMETAL JOINT ORGANIZATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

		Paragraphs	Page
	LETTER OF TRANSMITTAL		139
	INTRODUCTION	1 - 4	141
I.	BASIC INFORMATION REGARDING THE APPLICATION		142
II.	EXAMINATION OF THE TECHNICAL DATA AND INFORMATION TO DETERMINE WHETHER BOTH PARTS OF THE APPLICATION AREA ARE OF EQUAL ESTIMATED COMMERCIAL VALUE	5 - 33	144
III.	CONCLUSIONS	34	154

Annexes

I. List of members of the Group of Technical Experts 155

II. List of coordinates of areas*

---

* Confidential. Deposited with the Secretary-General.

/...

LETTER OF TRANSMITTAL

5 July 1991

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application from the Governments of the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, the Republic of Poland and the Union of Soviet Socialist Republics for registration of the Interoceanmetal Joint Organization as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts has undertaken an examination of the application in accordance with its mandate and the attached report which was unanimously adopted contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 1 and 5 July 1991 during which period the Group held seven sessions.

We regret that two members of the Group, Mr. Knut S. Heier (Norway) and Mr. Naphtali Ndiritu Kamundia (Kenya), were unable to attend the meeting. The Group wishes to express its appreciation for the cooperation of the representatives of the applicant, the Interoceanmetal Joint Organization.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist on the matter of registration of the Interoceanmetal Joint Organization. The Group also wishes to draw to your attention the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the secretariat of the Office for Ocean Affairs and the Law of the Sea in providing assistance throughout the meetings.

Yours sincerely,

Signed in New York on 5 July 1991:

Samuel SONA BETAH
(Cameroon)

Mr. José Luis Jesus
Chairman of the Preparatory Commission for
the International Seabed Authority and
for the International Tribunal for the
Law of the Sea
New York, New York

/...

Alfredo José DA SILVA NETTO
(Brazil)

Igor Sergeevich GRAMBERG
(Union of Soviet Socialist Republics)

Knut S. HEIER
(Norway) (absent)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya) (absent)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

David W. PASHO
(Canada)

Luis G. PREVAL PAEZ
(Cuba)

Toshio SAKASEGAWA
(Japan)

T. R. P. SINGH
(India)

ZHANG Bingxi
(China)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was mandated to determine whether applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the statement of understanding of 5 September 1986, and to submit a report on each application to the General Committee. The Group noted that in case of there being different opinions among its members, such opinions shall be included in the report (LOS/PCN/L.41/Rev.1, annex, para. 4).

2. In accordance with the relevant decision of the Preparatory Commission, the application from the Governments of the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, the Republic of Poland and the Union of Soviet Socialist Republics was examined to determine whether it was in conformity with resolution II taking into account that Interoceanmetal Joint Organization (IOM) "like other applicants, if it so wishes, will identify in its application area, an area totalling 52,300 square kilometres for incorporation in the area of up to 150,000 square kilometres to be allocated to it as a pioneer area. The provisions on relinquishment in resolution II, paragraph 1 (e), shall apply to the allocated area." 1/

3. It was noted that in accordance with paragraph 21 of the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex) "a group of all or several socialist States of Eastern Europe, or a group of State enterprises of such States, shall have the right to apply as pioneer investors in accordance with resolution II for one pioneer area until the United Nations Convention on the Law of the Sea enters into force". The following States - Bulgaria, Byelorussian SSR, Czechoslovakia, German Democratic Republic, Hungary, Poland, Ukrainian SSR and the USSR - were identified as falling within this category (LOS/PCN/L.41/Rev.1, annex, note a, p. 13).

4. The Group of Technical Experts held its initial meeting on the morning of 1 July 1991. The Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, briefed the Group on its mandate and outlined the specific procedures that would be in effect to ensure the confidentiality of data and information contained in the application from the Governments of the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, the Republic of Poland and the Union of Soviet Socialist Republics. The application was then opened in the presence of the representatives of the applicant Mr. Ryszard Labus, Director-General of IOM, and Mr. Arkadij G. Kraev, Deputy Director-General of IOM. The Group met each day in morning and afternoon sessions from 1 to 5 July 1991.

/...

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the applicant

1. Name of State(s) or certifying State(s):

Republic of Bulgaria

Republic of Cuba

Czech and Slovak Federal Republic

Republic of Poland

Union of Soviet Socialist Republics

2. Date of signature of the Convention by the certifying State or States:

10 December 1982

3. Applicant:

a. Name: Interoceanmetal Joint Organisation (IOM)

b. Mailing address: ul. Poludniowa 3
70-001 Szczecin, Poland

c. Telephone number: 82-41-61
Telex address: 422826 iom pl

d. Name of designated representative or designated authority: Mr. Ryszard Labus

e. Mailing address: ul. Poludniowa 3
70-001 Szczecin, Poland

f. Telex address: 422826 iom pl

4. Status of the applicant:

State ☐

State enterprise ☐

Natural or juridical person ☒

/...

5. Certificate of registration as a juridical person (if applicable)

Submitted: Yes ☒ No ☐

Not applicable ☐

6. Date of receipt of application: 8 March 1991

B. Data submitted by the applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Coordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances that the application area is located beyond the limits of national jurisdiction of any State

Submitted: Yes ☒ No ☐

6. Assurances of compliance with the provisions of resolution II and the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex)

Submitted: Yes ☒ No ☐

C. Payment of fee:

The certifying States declare that Interoceanmetal (IOM) will make the payment of $US 250,000 as the fee for registration as a pioneer investor and for the allocation of a pioneer area as soon as the applicant is advised by the Preparatory Commission.

/...

II. EXAMINATION OF THE TECHNICAL DATA AND INFORMATION TO DETERMINE WHETHER BOTH PARTS OF THE APPLICATION AREA ARE OF EQUAL ESTIMATED COMMERCIAL VALUE

A. Proposals

5. The basic proposal of the applicant identified an area of 300,000 square kilometres (fig. 1) which was subdivided into area A of 150,000 square kilometres to be reserved for the Authority and area B composed of an area of 52,300 square kilometres identified by the applicant to be incorporated into the pioneer area, and an area of 97,700 square kilometres, which the applicant hoped to be allocated to it. The applicant also provided two additional alternatives under variant II and variant III in which the total application area was subdivided into sectors of smaller areas. The sectors in turn were aggregated under two groups, one identified to be reserved for the Authority and the other to be allocated to the applicant including an area of 52,300 square kilometres identified by the applicant. However, the Group noted that the application, including all the variants, was in essence a proposed allocation of areas rather than a presentation of areas whereby the Group could recommend a selection between alternatives.

6. The applicant agreed that the Group could recommend any combinbation of sectors provided that the area to be allocated to the applicant included the area of 52,300 square kilometres identified by the applicant.

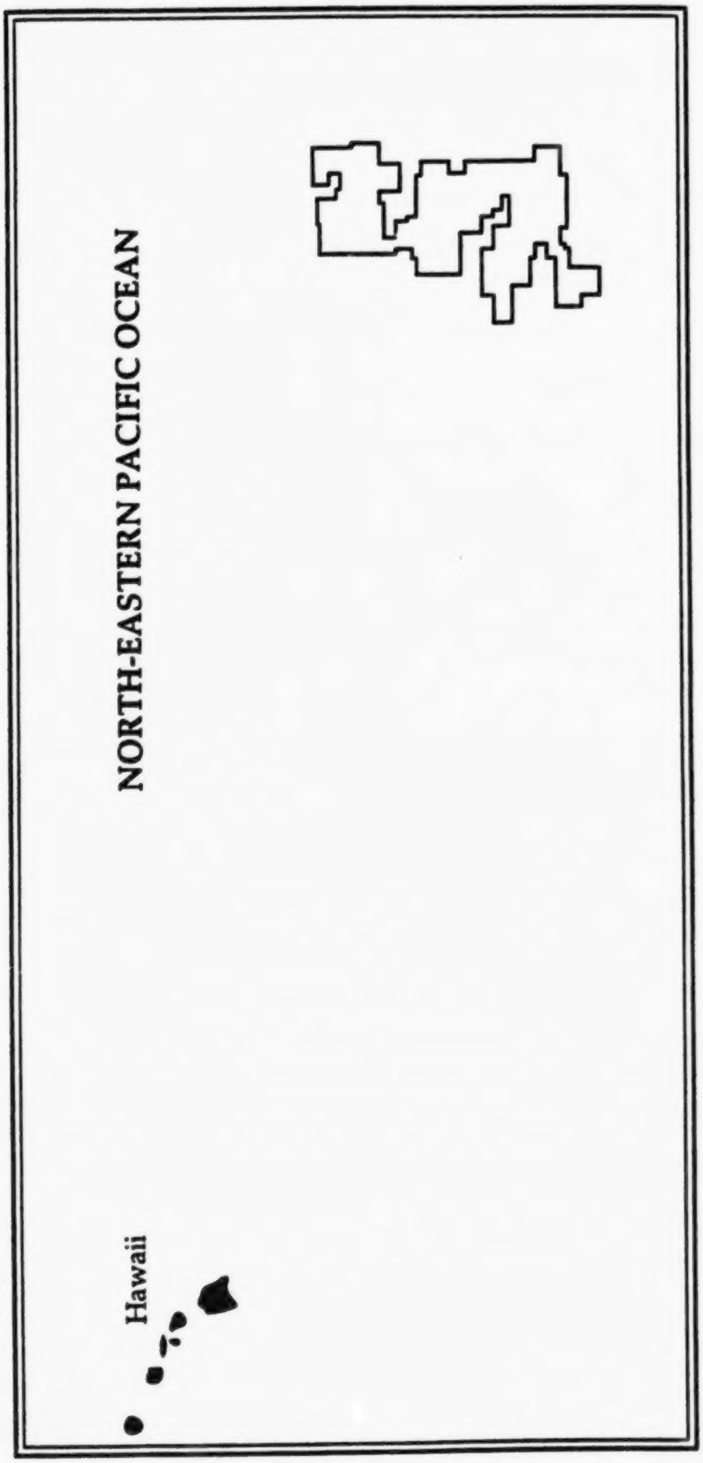


Figure 1. Overview of Application Area

/...

B. Data submitted

7. The following technical documents were included in the application:

(a) Maps:

(i) Overview of the application area, scale 1:10,000,000 (1);

(ii) Map of the location of the application area's sectors, scale 1:5,000,000 (1);

(iii) Application area location, scale 1:5,000,000 (1);

(iv) Station locations, scale 1:1,000,000 (2);

(v) Bathymetric chart, scale 1:1,000,000 (2);

(vi) Geomorphology chart, scale 1:1,000,000 (2);

(vii) Station locations and nodules population, scale 1:1,000,000 (2);

(b) Tables:

(i) List of coordinates of the Interoceanmetal application area (6 pages);

(ii) Catalogue of stations and chemical analysis of nodules (30 pages);

(iii) Estimated commercial value of the application area (1 page);

(c) Textual material:

(i) Technical characteristics of equipment used in prospecting of ferromanganese nodules (5 pages);

(ii) Hydrometeorological characteristics (1 page).

8. Additional technical details were given by the applicant in response to questions by the members of the Group of Experts.

9. The following additional material was provided by the applicant:

(a) Maps (2):

Disposition of sectors in the application area of Interoceanmetal;

(b) Tables:

Statistics of the amounts of polymetallic nodule resources in the application area of Interoceanmetal (2 pages);

Coordinates of turning-points of the sectors in the application area of Interoceanmetal (19 pages).

10. All technical data submitted in the application have been gathered using standard and recognized methods.

C. Methodology

1. General

11. The Group used a number of indicators that have proved useful in assessing equal estimated commercial value. As with previous applications, it was recognized that any approach should be based on the fact that the data reflect the prospecting or exploration stage and that they should be based on a relative comparison of the two areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

12. The most important factors were considered to be the metal content, nodule abundance and bathymetry. Because the complex relationship between these factors makes it impossible to make a comparative assessment on the basis of one single composite indicator, several indicators were used in order to ensure comprehensive consideration of the variety of factors that might now, or in the foreseeable future, have a major effect on the relative commercial values of the two areas.

13. As with previous applications, the Group, comprising experts in various disciplines, adopted a set of criteria and an approach that centred essentially on technical aspects.

14. Taking into account the relevant provisions contained in resolution II regarding mapping, sampling, abundance of nodules and their metal content, the Group used its established procedure for a thorough examination of every factor mentioned above.

15. In order to accomplish this task, the Group divided itself into five teams, as follows: the first carried out a comprehensive study of nickel; the second, manganese; the third, cobalt; the fourth, the abundance and tonnage of nodules; and the fifth, an examination of the seabed topography.

/...

2. Metal content

16. The Group evaluated the relative amounts of nickel, cobalt and manganese metal contained in the nodules from each area. The basic information used to make this comparison was developed by calculating the metal accumulation, taken as the per cent metal times the nodule abundance at each of some 1,000 stations. These values, together with per cent metal, were plotted on charts in order to evaluate the relative distribution and trends in various areas. This procedure was carried out for each metal and used to determine whether one or the other area contained either larger areas of higher-grade nodules and/or greater a quantity of contained metals.

17. An additional analysis was made of the cumulative frequency distribution of the metal accumulations in various sectors of areas A and B. This was done in order to assess possible differences that might not be reflected in the data on the mean value of metals in the areas.

3. Abundance

18. The data on abundance given for each station were used to verify the average abundance and the tonnage of nodules provided by the applicant, as well as their range of variation at the 95 per cent confidence level in all the individual sectors. Consolidation of those individual sectors into the broader sectors of the original proposal was also done. The distribution of the data in the different sectors was also examined to assess possible differences.

4. Bathymetry and geomorphology

19. The Group was provided with a bathymetric chart at a scale of 1:1,000,000 that was sufficient to enable it to determine the overall picture of the relief of the seabed of the application area and its principal characteristics. The bathymetric data and geomorphological characteristics of the area were analysed by comparing bathymetric maps and verifying the data on the depth of the seabed at different sites within the area. Account was taken of the slope of the seabed relief in various parts of the area as well as other geological features: volcanic and tectonic structures, sedimentation, erosion and shifting accumulation. The influence of relief and water depth on future exploration and exploitation activities was considered.

D. Results of the evaluation

1. Adequacy of data

20. The Group reviewed the type, frequency and spatial distribution of the data and concluded that they were adequate for developing information that could be used to assess two areas of equal estimated commercial value. The

/...

data are also adequate to show that the areas have similar technical characteristics which make them worthy of further exploration in order to delineate possible mine sites.

21. The Group agreed that the areas are so distributed that the hydrological and meteorological conditions in the different sectors of the application area are similar.

2. Identification of sectors for evaluation

22. The division of the total application area into sectors of smaller areas facilitated the work of evaluation. From the information supplied, the Group identified a sector A3 which, with a marginal reduction in size, could be compared with the sector B4 identified by the applicant for incorporation into the area to be allocated to the applicant (fig. 2). The Group also examined various combinations of sectors for comparison of estimated commercial value and concluded that residual sectors in area A (excluding sector A3 as defined above) and residual sectors in area B (excluding sector B4) represented the best combinations.

/...

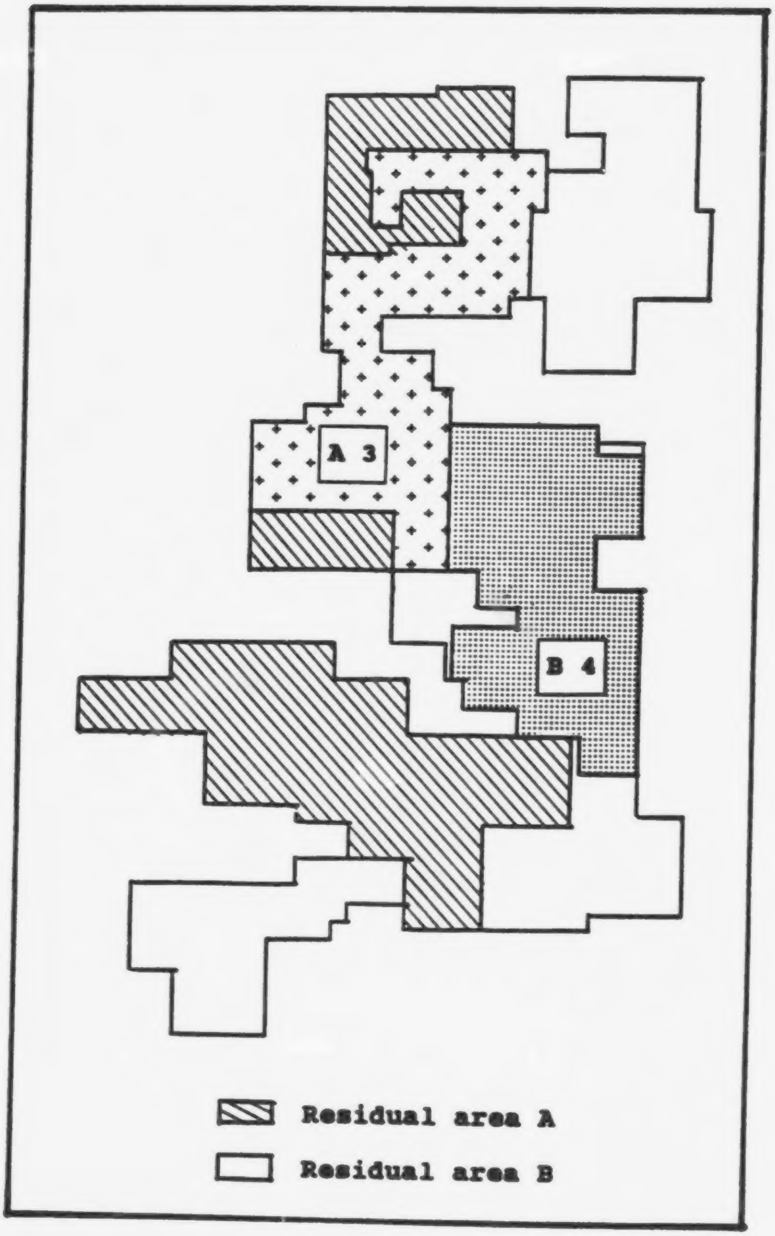


Figure 2. Disposition of sectors A3 and B4 in the application area.

3. Metal content

23. The Group carried out an evaluation of nickel, cobalt and manganese in the areas. It was decided not to develop separate information on copper in view of the well-established relationship between copper and nickel that allows the characteristics of copper to be closely approximated by the analysis of nickel.

24. Nickel. In the case of nickel, an evaluation of the mean values of nickel in different sectors of the total application area indicated that they were in agreement with the estimates provided by the applicant. In particular, the mean nickel values, the frequency distribution of nickel values and the contained metal tonnages of sectors B4 and A3 were comparable. The residual area A and the residual area B, each of 97,700 square kilometres, were also found to be similar in respect of metal grades as well as metal tonnages.

25. Manganese. Manganese was considered with respect to per cent metal content as well as accumulations in terms of statistical and spatial distributions. The analysis of data led to conclusions identical to those obtained for nickel.

26. Cobalt. The spatial distribution of cobalt accumulation was found to be more consistent in the central part of the application area than in the northern and southern parts. The statistical distribution of cobalt values suggested that sectors B4 and A3 are generally similar to each other, notwithstanding the slightly higher values in A3. Further, the combination of sector A3 and the residual areas of A in the north and south of the application area has cobalt values similar to the combination of sector B4 and the residual areas of B in the north and south of the application area.

4. Abundance and tonnage

27. The results of the calculation of the abundance and tonnage of nodules correspond with the information given in the application and with the additional information provided by the applicant. Sector A3 was found to be similar to sector B4 in terms of abundance and tonnage of nodules. Likewise, residual area A was found to be similar to residual area B.

5. Bathymetry and geomorphology

28. The analyses of the bathymetric and geomorphological maps have revealed similarities between the different sectors of the application area. The sea bottom is slightly hilly with a few sea mounts of up to 1,000 metres in height, which are more concentrated in the north-west and central parts of the area where volcanogenic types of relief are found.

/...

29. Major structures are oriented NW-SE and N-S and are characterized by tectonic features. The northern part of the application area has the highest elevations, where average water depth is 4,000 metres. The maximum depths (over 4,600 metres) are found in the southern part due to location of the Clipperton fault abyss. Sea-bottom slopes do not exceed 6° and in the sectors A3 and B4 the slopes do not exceed 4°.

30. The total application area could be divided into three main parts oriented NW-SE, each one with its own particular morphology and water depths. If the application area is divided into two longitudinal blocks, the western and eastern blocks will be similar.

31. Considering the distribution of overall geomorphological and bathymetric features, areas A and B are similar.

E. Selection of areas

32. In the light of the above evaluations, the Group proceeded to consider the selection of areas to be allocated to the applicant and the area to be reserved for the Authority. It was found that an area of 52,300 square kilometres identified in sector A3 was of equal estimated commercial value to that of sector B4. Sector A3, when combined with residual area A, was of equal commercial value to sector B4 combined with residual area B. Each of these combinations makes an area of 150,000 square kilometres.

33. The coordinates of areas A and B have been determined by the Group of Technical Experts and are contained in a sealed envelope deposited with the Secretary-General of the United Nations. Figure 3 shows the proposed disposition of areas.

/...

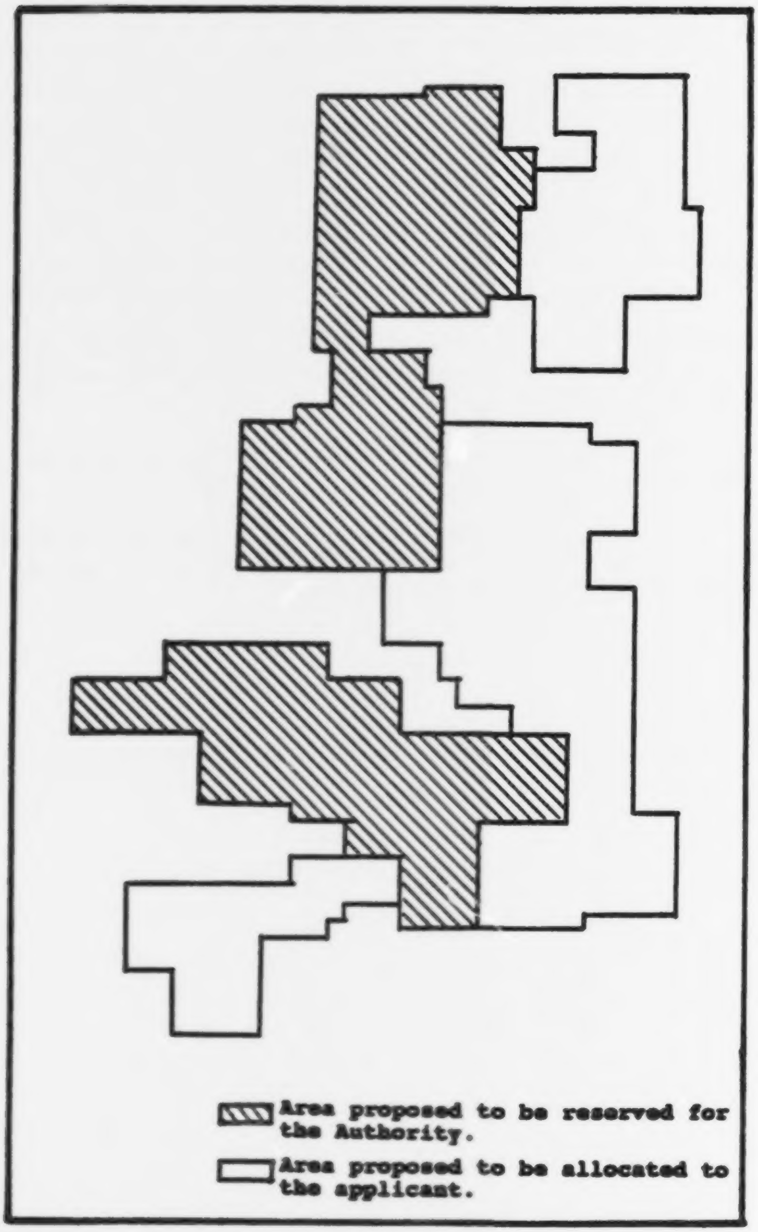

▨ Area proposed to be reserved for the Authority.
☐ Area proposed to be allocated to the applicant.

Figure 3. Disposition of areas in the application of Interoceanmetal.

III. CONCLUSIONS

34. The following conclusions were reached unanimously by the Group:

(a) Having examined the technical particulars submitted by the applicant which are summarized in section I of the present report, the Group concluded that the application has been submitted in accordance with resolution II and the understanding contained in document LOS/PCN/L.41/Rev.1;

(b) Having evaluated the technical data and information submitted by the applicant as referred to in section II of the present report, the Group determined that areas A and B are of equal estimated commercial value;

(c) As regards the designation of the reserved area and the allocation of the pioneer area, the Group agreed to recommend for the consideration of the General Committee:

- (i) That area A should be designated as the area to be reserved for the Authority;
- (ii) That area B, which includes an area of 52,300 square kilometres identified by the applicant, should be designated as the pioneer area to be allocated to the applicant.

Notes

1/ Paragraph 13 (3) of the statement on the implementation of resolution II, contained in the annex to document LOS/PCN/L.41/Rev.1.

Annex I

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

1. Mr. Samuel Sona Betah
   Director of Geology
   Ministry of Mines, Water and Power
   Yaounde, Cameroon

2. Dr. Alfredo Jose da Silva Netto
   Rua Marques de Abrantes, 115/1102
   Rio de Janeiro, RJ
   CEP 22230 Brazil
   Brazil

3. Dr. Igor Sergeevich Gramberg
   Director, All-Union Research
   Institute of Geology and Mineral Resources of the World's Ocean
   (VNII Okeanogeologiya)
   Ministry of Geology of the USSR
   Moscow, USSR

4. Dr. Knut S. Heier
   Director
   Geological Survey of Norway
   Leiv Eirikssons vei 39
   PO Box 3006 Lade
   N-7002 Trondheim
   Norway

5. Mr. Hicuunga H. E. Kambaila
   Chief Inspector of Mines
   Mines Safety Department
   P.O. Box 21006
   Kitwe, Zambia

6. Mr. Naphtali Ndiritu Kamundia
   Geologist, Government of Kenya
   P.O. Box 30009
   Nairobi, Kenya

7. M. Jean-Pierre Lenoble
   Institut français de recherche pour l'exploitation de la mer (IFREMER)
   155, rue Jean-Jacques Rousseau
   92138 Issy les Moulineaux Cedex
   France

/...

8. Dr. Alfonso López-Reina
Geologist
Transversal 44B #100-49
Casa 11, La Cancionera
Bogota, DE
Colombia

9. Mr. Sulaiman Zuhdi Pane
Vice President/Head of Foreign Contractors Management Body
Pertamina
Jalan Merdeka Timur No.1A
Jakarta (10010)
Indonesia

10. Mr. David W. Pasho
Director, Resource Management Division
Mineral Policy Sector
Department of Energy, Mines and Resources
460 O'Connor Street, 11th Floor
Ottawa, Canada

11. Eng. Luis G. Preval Paez
Principal Engineer for the Nickel Industry
Ministry of Basic Industry
Avenida Salvador Allende 666
Havana 3, Cuba

12. Mr. Toshio Sakasegawa
Director
Technology Development Department
Metal Mining Agency of Japan
Tokiwa Building
1-24-14, Toranomon, Minato-ku
Tokyo, Japan

13. Dr. T. R. P. Singh
Deputy General Manager
Engineers India Ltd.
R.K. Puram
New Delhi 110066
India

14. Dr. Zhang Bingxi
Director, Higher Advisory Centre for Science and Technology
Ministry of Geology and Mineral Resources
No. 64, Funeidajie
Xisi, Beijing 100812
China

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.10
25 February 1992

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February - 13 March 1992

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA

CONTENTS

		Paragraphs	Page
	LETTER OF TRANSMITTAL		158
	INTRODUCTION	1 - 5	160
I.	PREPARATORY WORK AS ENVISAGED BY THE GROUP	6 - 12	160
II.	REVIEW OF THE REPORT ON THE PREPARATORY WORK	13 - 18	161
	A. Contents of the Report	13 - 14	161
	B. Data used in the preparatory work	15 - 17	162
	C. Output of the preparatory work	18	162
III.	REVIEW OF THE METHODOLOGY USED	19 - 24	163
IV.	MAJOR CONCLUSIONS CONTAINED IN THE REPORT	25 - 26	164
V.	CONCLUSIONS AND RECOMMENDATIONS	27 - 28	164
Annex.	LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS		167

/...

LETTER OF TRANSMITTAL

20 February 1992

Dear Mr. Chairman,

We, the members of the Group of Technical Experts, were convened to review and evaluate the joint report carrying the rubric "Preparatory Work in the International Authority Reserved Area - August 1991". This report was prepared by the registered pioneer investors, France, Japan and the Soviet Union, in accordance with the Understanding on the Fulfillment of Obligations by the Registered Pioneer Investors and their Certifying States (LOS/PCN/L.87, annex, para. 7). It was transmitted to the Special Representative of the Secretary-General for the Law of the Sea for submission to the Preparatory Commission.

The Group met between 18 and 20 February 1992 at United Nations Headquarters and held five meetings.

We regret that six members of the Group, Mr. Samuel Sona Betah (Cameroon), Mr. Knut S. Heier (Norway), Mr. Naphtali Ndiritu Kamundia (Kenya), Mr. Sulaiman Zuhdi Pane (Indonesia), Mr. David W. Pasho (Canada) and Mr. Luis G. Preval Paez (Cuba), were unable to attend this meeting.

In accordance with the relevant decision of the Preparatory Commission, the Group made a detailed examination of the documents submitted jointly by the three pioneer investors and concluded that the objective of the preparatory work as contained in document LOS/PCN/BUR/R.5 has been fully met, thus facilitating the detailed planning of stage I of the exploration plan.

The Group of Experts would like to thank you and the Preparatory Commission for the opportunity to assist in the implementation of the obligations of the pioneer investors. The Group also wishes to draw your attention to the valuable contribution made by the Special Representative of the Secretary-General for the Law of the Sea, Mr. Satya N. Nandan, and the Secretariat of the Office for Ocean Affairs and the Law of the Sea in providing assistance throughout the meetings.

Mr. José Luis Jesus
Chairman of the Preparatory Commission for
  the International Seabed Authority and
  for the International Tribunal for the
  Law of the Sea
New York, New York

/...

Yours sincerely,

Signed in New York on 20 February 1992:

Samuel SONA BETAH
(Cameroon) (*absent*)

Alfredo José DA SILVA NETTO
(Brazil)

Igor Sergeevich GRAMBERG
(Russian Federation)

Knut S. HEIER
(Norway) (*absent*)

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu Kamundia
(Kenya) (*absent*)

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia) (*absent*)

David W. PASHO
(Canada) (*absent*)

Luis G. PREVAL PAEZ
(Cuba) (*absent*)

Toshio SAKASEGAWA
(Japan)

T. R. P. SINGH
(India)

ZHANG Bingxi
(China)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission of the International Seabed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the Statement of Understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group in its meeting in August 1989 had prepared an exploration plan for reserved areas in the central region of the North-East Pacific (LOS/PCN/BUR/R.5 of 16 August 1989) and had identified a stage of Preparatory Work to be completed before the activities of stage I of the exploration plan could begin.

2. The Group was convened to undertake a technical review of the Preparatory Work carried out by the three registered pioneer investors, namely IFREMER/AFERNOD, DORD and Yuzhmorgeologiya.

3. In accordance with document LOS/PCN/L.41/Rev.1, annex, paragraph 4, in case of there being different opinions among its members, such opinion should be included in the report.

4. The Group commenced its work on 18 February 1992. The Special Representative briefed the Group on its mandate.

5. The Group examined in detail the report on the Preparatory Work prepared by the three pioneer investors.

I. PREPARATORY WORK AS ENVISAGED BY THE GROUP

6. The Group, in its earlier report on the exploration plan for reserved areas in the central region of the North-East Pacific, had identified a stage of preparatory work before implementation of the exploration plan under stage I.

7. It will be recalled that the reserved areas for which the preparatory work and exploration plan was proposed refer to the central region of the North-East Pacific consisting of three blocks which are made up of six sectors that constitute a total area of 71,570 square kilometres, including the area of 52,300 square kilometres contributed by the pioneer investors. This region is situated in a structural zone striking WSW-ENE located between the Clarion fracture zone to the north and the Clipperton fracture zone to the south. (see Fig. 1)

8. The Group, while drawing up the exploration plan, had noted that there was need to compile and reconcile the data submitted by the various pioneer investors and hence had recommended that this preparatory work preceded the implementation of the exploration plan.

9. The objective of the preparatory work was to compile and illustrate all the existing data in the areas reserved for the Authority in the central region in order to facilitate detailed planning and implementation of stage I of the exploration plan.

/...

10. It was envisaged that the data would be compiled from a variety of sources. These would include data submitted by the registered pioneer investors and additional data collected by individual pioneer investors in areas that were not part of the specific areas covered in their respective applications.

11. A comprehensive data base for sample stations was expected to be established and bathymetric information from all the areas were to be compiled including information collected by such means as precision depth recorders and multi-beam echo sounders. Relevant information on nodule distribution, small scale features and other information from photography and multi-frequency exploration system were expected to be compiled.

12. The output expected from the preparatory work included:

(a) Series of base maps;

(i) Index maps;

(ii) Bathymetric maps;

(iii) Metal content maps;

(iv) Abundance maps;

(v) Metal accumulation maps;

(b) Series of interpreted maps;

(c) Computerized database for samples.

II. REVIEW OF THE REPORT ON THE PREPARATORY WORK

A. Contents of the Report

13. The report on the preparatory work prepared and submitted jointly by the three pioneer investors provides a compilation and illustration of all the existing data for the 71,570 square kilometres of the areas reserved for the Authority in the central region. The report is divided into four chapters. Chapter I describes the equipment and methods used by the three pioneer investors during the survey of these areas. Chapter II presents the data acquired by the three pioneer investors. Chapter III describes the characteristics of the potential ore deposit and Chapter IV contains recommendations for the future work.

14. The report makes a detailed presentation on the comparability of the data generated by each pioneer investor and discusses the methodology used in reconciliation of the data acquired by different sources so as to allow use of common data treatment methods in subsequent analysis.

B. Data used in the Preparatory Work

(i) Data on Sample Stations

15. The data on sample stations used in the preparatory work include the data provided by the three pioneer investors in their original applications for registration as well as those that were collected by individual pioneer investors in areas that were not part of the specific areas covered in their respective applications. Accordingly, while the number of sample stations in the Authority's areas under reference as provided by the pioneer investors in their original applications was only 231 the number of sample stations in the Authority's area used in the preparatory work amounts to 511, an increase of more than 100% in the number of sample stations.

(ii) Data on Bathymetry

16. Bathymetric information collected by individual pioneer investor and using different means such as single beam echo sounder, precision depth recorders and multi-beam echo sounders have been compiled and a composite contour map generated. This included 25,251 kilometres of single bathymetric profiles and 5,800 square kilometres of multi-beam surveys.

(iii) Other relevant data

17. Relevant information on nodule distribution, small-scale features and other information from seabed spot photography and multi-frequency exploration system have been compiled. This included 21,685 kilometres of multi-frequency exploration system and seismo-acoustic profiling.

C. Output of the Preparatory Work

18. After compilation, reconciliation/adjustment of data from various sources, a comprehensive study of the area reserved for the Authority in the central region has been made. The output of the study in the form of maps/summary data presented in the report includes the following:

ANNEXES

Annex 1	Catalogue of sample station data
Annex 2	Coordinates of the area reserved for the International Seabed Authority
Annex 3	Estimation of blocks by kriging (a set of 11 coloured maps at a scale of 1:4,000,000 showing abundance, metal contents and metal accumulations)

MAPS

Map 1	Location of sample stations (scale 1:1,000,000)
Map 2.1	Bathymetric map of Block 1 (scale 1:500,000)
Map 2.2	Bathymetric map of Block 2 (scale 1:500,000)
Map 2.3	Bathymetric map of Block 3 (scale 1:500,000)
Map 3	Abundance map (scale 1:1,000,000)

/...

Map 4	Sketch map of the standard deviation of the nodule abundance (scale 1:4,000,000)
Map 5	Multi-frequency Exploration System (MFES) abundance map (scale 1:1,000,000)
Map 6	Metal content map: Manganese (scale 1:1,000,000)
Map 7	Metal content map: Iron (scale 1:1,000,000)
Map 8	Metal content map: Nickel (scale 1:1,000,000)
Map 9	Metal content map: Copper (scale 1:1,000,000)
Map 10	Metal content map: Cobalt (scale 1:1,000,000)
Map 11	Metal accumulation map: Manganese (scale 1:1,000,000)
Map 12	Metal accumulation map: Iron (scale 1:1,000,000)
Map 13	Metal accumulation map: Nickel (scale 1:1,000,000)
Map 14	Metal accumulation map: Copper (scale 1:1,000,000)
Map 15	Metal accumulation map: Cobalt (scale 1:1,000,000)

DATA DISKETTE

A 720 megabyte 3.5 inch MS/DOS formatted diskette is provided with the report. The diskette contains the database of the sample stations in two formats: ASCII and dBase.

III. REVIEW OF THE METHODOLOGY USED

19. The three registered pioneer investors compiled all the data available in the area reserved for the Authority in the central region of the North-East Pacific. As mentioned earlier, these included not only the information already submitted by the pioneer investors in their applications but also the data they collected in areas that were not part of the specific area covered in their respective applications.

20. The information relating to sampling was examined carefully by several statistical methods in order to verify its consistency and its homogeneity. It was found that, although most of the data were comparable and did not show any bias, the IFREMER/AFERNOD values of nodule abundance were lower than the values obtained by the other two pioneer investors. This difference is attributed to the very conservative corrections used by IFREMER/AFERNOD in comparing photographs of the seabed and mechanical sampling carried out at the same location in order to match the observed underestimations of their free-fall grab devices.

21. An adjustment process was used in order to allow the merging of all the data, based on the advanced geostatistical method of Gaussian anamorphosis.

22. The sampling station data base, obtained after merging of all data, was used to compute the major characteristics of the potential ore deposit: abundance of nodules, metal content of the nodules and metal accumulation for manganese, iron, nickel, copper and cobalt. The maps showing these characteristics were drawn by computer from a kriged grid of 2.5 kilometres by 2.5 kilometres in contour lines and in spotted colour display. The total tonnages of the nodules and of the contained metals were also calculated. It was emphasized that the zonation displayed by the coloured maps must be used very cautiously as the present level of information does not provide sufficient accuracy on local scales.

/...

23. The bathymetric data were also checked on the crossing points of the survey lines laid down by different pioneer investors. The observed differences were found compatible with the accuracy of the equipment used (1%). Bathymetric maps were then drawn by computer using all the available information. These maps provide the general features of the bottom relief. However, they do not reflect the detailed local topography because the spacing between sounding lines was too large compared to the dimensions of the topographic features.

24. The multi-frequency acoustic surveys made by the two pioneer investors (DORD and Yuzhmorgeologiya) were compared. Although only a limited part of the area was surveyed by both pioneer investors, the results were found to be very similar. They give an evaluation of the nodule abundance on large areas and are complementary to the sampling stations.

IV. MAJOR CONCLUSIONS CONTAINED IN THE REPORT

25. An evaluation of all the data used in the preparatory work suggests that:

- the areas reserved for the Authority in the central region contain large quantities of nodules, larger than those estimated at the time of evaluation of the applications of the three pioneer investors mainly on account of a larger number of sample points and of upward calibration of the IFREMER/AFERNOD data;
- approximately 30% of the stations contain high abundance values suitable for first generation mining systems;
- approximately 20% of the stations have nodules of high metal content.

26. Based on the present study, there are indications of some areas being more potential than others but such conclusions cannot be firmed up on account of:

- variable levels of information over the entire area, and
- the bathymetric methods used in the major parts of the area not being sufficiently reliable in bringing out the topographic details.

V. CONCLUSIONS AND RECOMMENDATIONS

27. Based on the detailed examination of the documents submitted jointly by the three pioneer investors on the preparatory work, the Group concludes that:

- the activities and the means employed by the pioneer investors for executing the preparatory work and its outputs are in conformity with the requirements set out by the Group in its earlier report of 16 August 1989 (document LOS/PCN/BUR/R.5);

/...

- the methodology employed for reconciliation/adjustment of data from various sources is of a high technical order; and

- the objective of the preparatory work has been fully met in that the compilations and illustrations are comprehensive to facilitate detailed planning of the stage I of the exploration plan.

28. The Group recommends that:

- the implementation of the stage I of the exploration plan may now be undertaken;

- the stage I of the exploration plan must cover the entire area of 71,570 square kilometres and not be limited to promising areas based on present indications;

- a detailed work plan and operational schedule for the exploration of stage I may be developed jointly by the three pioneer investors;

- multi-beam bathymetric mapping and multi-frequency acoustic mapping with sampling necessary for calibration may be taken up independently of each other. Sampling and spot photography at 15 kilometres by 15 kilometres grid may then be undertaken in areas selected on the basis of the results of the multi-beam and multi-frequency acoustic surveys;

- the Office for Ocean Affairs and Law of the Sea may acquire, when necessary, the hardware and software that may be helpful in future to process the data for producing the desired maps and tables.

/...

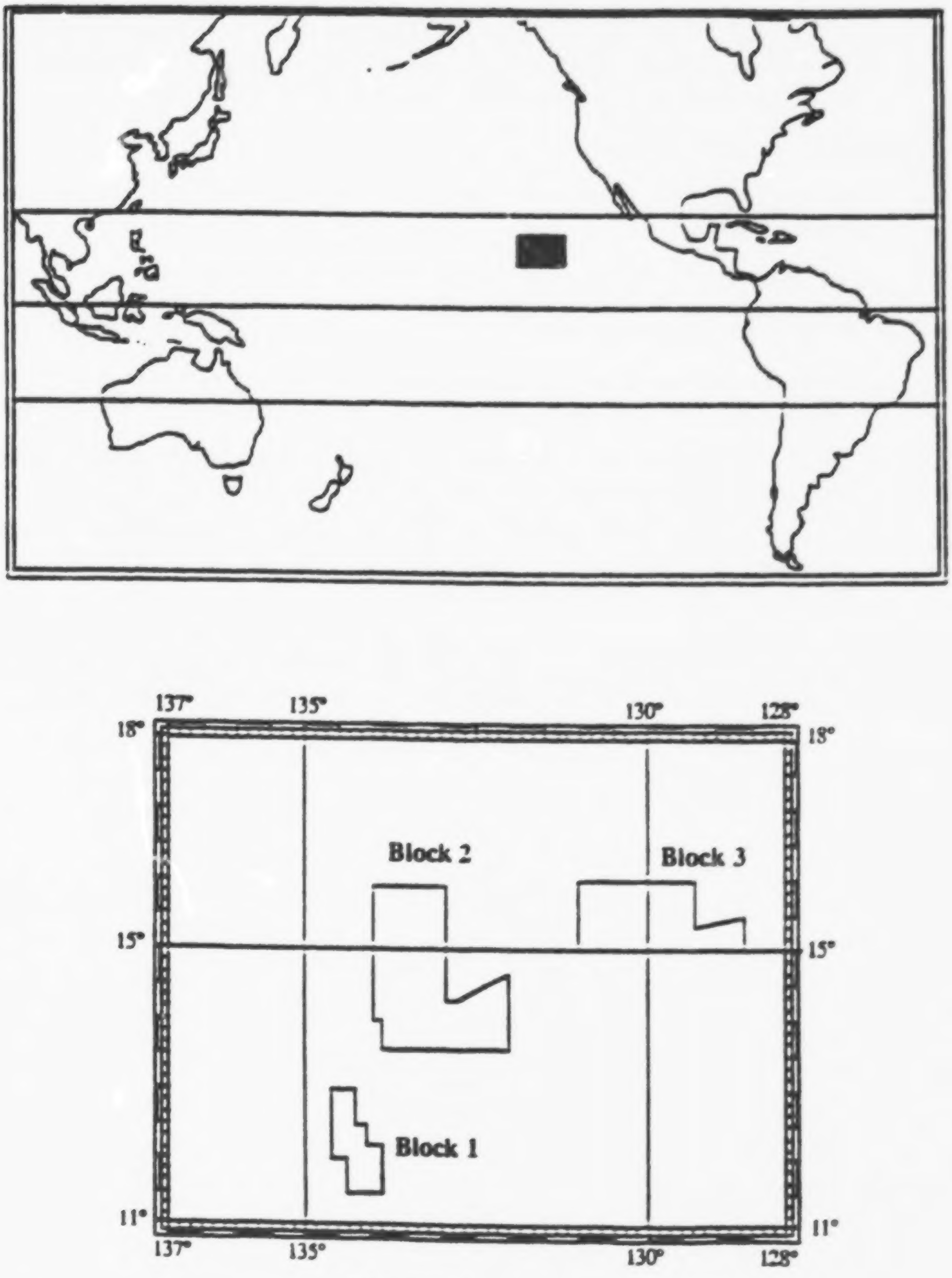


Figure 1
Location of the area reserved for the
Authority in the central region

/...

Annex

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

Mr. Samuel Sona Betah
Director of Geology
Ministry of Mines, Water & Power
Yaounde, Cameroon

Dr. Alfredo Jose da Silva Netto
Rua Marques de Abrantes, 115/1102
Rio de Janeiro, RJ
Cep 22230
Brazil

Dr. Igor Sergeevich Gramberg
Institute of Geology and Mineral Resources
  of the World's Ocean (Vnii Oceanogeologia)
Committee of Geology of the Russian Federation
Moscow, Russian Federation

Dr. Knut S. Heier
Director
Geological Survey of Norway
Leiv Erikssons Vei 39
PO Box 3006 Lade
N-7002 Trondheim
Norway

Mr. Hicuunga H.E. Kambaila
Chief Inspector of Mines
Mines Safety Department
P.O. Box 21006
Kitwe, Republic of Zambia

Mr. Naphtali Ndiritu Kamundia
Geologist, Government of Kenya
P.O. Box 30009
Nairobi, Kenya

M. Jean-Pierre Lenoble
Institut Francais de Recherche pour
  l'exploitation de la Mer (IFREMER)
155 rue Jean-Jacques Rousseau
92138 Issy les Moulineaux CEDEX
France

/...

Dr. Alfonso Lopez-Reina
Geologist
Calle 76 #9-56
Piso no. 4
Bogota de Colombia

Mr. Sulaiman Zuhdi Pane
Vice President/Head of Foreign
Contractors Management Body
Pertamina Bppka
Jln. Merdeka timur no. 1A
Jakarta 10010
Indonesia

Eng. Luis G. Preval Paez
Principal Engineer for the
Nickel Industry
Ministry of Basic Industry
Avenida Salvador Allende 666
Havana 3, Cuba

Mr. David W. Pasho
Director, Resource Management
Mineral Policy Sector,
Department of Energy, Mines and Resources
460 O'Connor Street, 11th Floor
Ottawa, Canada

Mr. Toshio Sakasegawa
Director
Technical Cooperation Division
Overseas Activities Department
Metal Mining Agency of Japan
Tokiwa Building
1-24-14, Toranomon, Minato-ku
Tokyo, Japan

Dr. T.R.P. Singh
Deputy General Manager
Engineers India Ltd.,
R.K. Puram
New Delhi 110066
India

Dr. Zhang Bingxi
Director, Higher Advisory Center
for Science and Technology
Ministry of Geology and Mineral Resources
No. 64, Funeidajie
Xisi, Beijing 100812
People's Republic of China

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.10/Add.1
24 July 1992

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
New York, 10-21 August 1992

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA

Addendum

Material of a non-confidential nature additional to that presented in the report contained in document LOS/PCN/BUR/R.10, provided by the Secretariat at the request of the General Committee

I. EXPLANATORY NOTE

A. Background

1. The members of the Group of Technical Experts were convened to review and evaluate the joint report carrying the rubric "Preparatory Work in the International Seabed Authority Reserved Area - August 1991". That joint report had been prepared by the registered pioneer investors - France, Japan and the then Union of Soviet Socialist Republics - in accordance with the Understanding on the Fulfilment of Obligations by the Registered Pioneer Investors and their Certifying States (LOS/PCN/L.87, annex, para. 7).

2. The Group met between 18 and 20 February 1992 at United Nations Headquarters and held five meetings. In accordance with the relevant decision of the Preparatory Commission, the Group made a detailed examination of the documents submitted jointly by the three pioneer investors and presented its report thereon to the General Committee of the Preparatory Commission. The report is contained in document LOS/PCN/BUR/R.10 of 25 February 1992.

3. At its meeting on 12 March 1992, the General Committee considered the report and approved the recommendations contained therein.

4. At the same meeting, the General Committee also requested the Secretariat to provide material of a non-confidential nature additional to that presented in the report of the Group of Technical Experts for the purpose of providing a better understanding of the preparatory work carried out by the three registered pioneer investors with regard to the reserved area.

5. In response to that request, the Secretariat has prepared the present document, which provides such additional material. The present document is thus a complement to document LOS/PCN/BUR/R.10, and should be read in conjunction with the latter.

6. The presentation of this additional material is introduced by a section on the issue of confidentiality of data and information relating to the area reserved for the Authority. In preparing the present document, the Secretariat attempted to provide additional material of a non-confidential nature, essentially elaborating and, in some instances, furnishing commentaries on the material presented in the report of the Group of Technical Experts. In most cases, additional material was excerpted from the joint report of the three registered pioneer investors, which was deemed to be of a non-confidential nature, because (a) such material is available in the public domain, (b) such material has been disclosed in the publicly available reports of the pioneer investors themselves to the Preparatory Commission, or publicly available documents released with the consent of the pioneer investors (see LOS/PCN/BUR/INF/R.1-11 and LOS/PCN/BUR/R.11-14), and/or (c) such material has been disclosed in the publicly available documents of the General Committee, or reports of the Group of Technical Experts to the General Committee (see LOS/PCN/94, 97-99, 117, 122, and LOS/PCN/BUR/R.1-8).

B. Confidentiality of data and information relating to the area reserved for the Authority

7. Under resolution II of the Third United Nations Conference on the Law of the Sea, an application for pioneer status shall contain all the data available to the applicant with respect to both parts of the area, i.e., the two parts of equal estimated commercial value, one part to be reserved for the Authority, and the other part to be allocated to the pioneer investor as a pioneer area. The data shall include, inter alia, "information relating to mapping, testing, the density of polymetallic nodules and their metal content". The resolution expressly provides that "in dealing with such data, the Commission and its staff shall act in accordance with the relevant provisions of the Convention and the Annexes concerning the confidentiality of data."

8. For an understanding of the issue of confidentiality, reference should be made to the principles contained in the relevant provisions of the Convention on the Law of the Sea and its annexes. The relevant provisions are contained in article 163, paragraph 8, article 168, paragraph 2, and annex III, article 14, paragraph 3. Those provisions are as follows:

/...

"Article 163

"Organs of the Council

"...

"8. Members of Commissions shall have no financial interest in any activity relating to exploration and exploitation in the Area. Subject to their responsibilities to the Commissions upon which they serve, they shall not disclose, even after the termination of their functions, any industrial secret, proprietary data which are transferred to the Authority in accordance with annex III, article 14, or any other confidential information coming to their knowledge by reason of their duties for the Authority."

"Article 168

"International character of the Secretariat

"...

"2. The Secretary-General and the staff shall have no financial interest in any activity relating to exploration and exploitation in the Area. Subject to their responsibilities to the Authority, they shall not disclose, even after the termination of their functions, any industrial secret, proprietary data which are transferred to the Authority in accordance with annex III, article 14, or any other confidential information coming to their knowledge by reason of their employment with the Authority."

"Annex III. Basic conditions of prospecting, exploration and exploitation

"Article 14

"Transfer of data

"...

"3. Data transferred to the Authority by prospectors, applicants for contracts or contractors, deemed proprietary, shall not be disclosed by the Authority to the Enterprise or to anyone external to the Authority, but data on the reserved areas may be disclosed to the Enterprise. Such data transferred by such persons to the Enterprise shall not be disclosed by the Enterprise to the Authority or to anyone external to the Authority."

/...

9. Article 163, paragraph 8, imposed on members of the Legal and Technical Commission and of the Economic Planning Commission, inter alia, a duty not to disclose "any industrial secret, proprietary data which are transferred to the Authority in accordance with annex III, article 14, or any other confidential information coming to their knowledge by reason of their duties for the Authority." A similar duty is imposed on the Secretary-General and the staff through the operation of article 168, paragraph 2. Annex IV, article 7, paragraph 5, extends this duty to the staff of the Enterprise.

10. The provisions contained in annex III, article 14, paragraph 3, are of particular relevance. Data which are transferred to the Authority by prospectors, applicants for contracts or contractors, deemed proprietary, shall not be disclosed by the Authority to the Enterprise except for the data concerning the reserved area. The article goes on to state that: "Such data transferred by such persons to the Enterprise shall not be disclosed by the Enterprise to the Authority or to anyone external to the Authority". That provision must mean that data on the reserved area are also considered confidential data and information.

11. The Preparatory Commission has attempted to create precise rules on the confidentiality of data and information, but these rules have not been adopted. See in particular the suggestions by the Chairman of the Preparatory Commission on rules 14, 15 and 16 for inclusion in the draft rules for the registration of pioneer investors under resolution II (LOS/PCN/WP.24) in 1984. Those suggestions dealt with the rules which should govern the classification of confidentiality of data and information by or on behalf of the applicant; classification of confidentiality of data and information by the Chairman of the Preparatory Commission and the technical experts; access to confidential data and information; cessation of confidentiality; and the duty to preserve confidentiality. Those rules were in fact based on the draft rules on the designation of confidential material prepared by the Secretariat (LOS/PCN/WP.16/Rev.1, annex).

12. On the specific question concerning confidential data and information relating to the reserved area, rule 16 C (4) stated that: "Confidential material relating to the part of the area to be reserved for the Authority in accordance with paragraph 3 of resolution II shall cease to be confidential material from such date as the Preparatory Commission may prescribe". In this connection it was further noted that the Preparatory Commission might wish to consider whether confidential material relating to the area designated to be reserved for the Authority should become proprietary data of the Commission as of the time of the allocation of the area.

13. As has been said before, these rules were not adopted by the Preparatory Commission, nor did the Preparatory Commission address the question as to whether confidential material relating to the reserved area should become proprietary data of the Commission as of the time of the allocation.

/...

14. It should be noted that, in accordance with the 1986 Statement on the Implementation of Resolution II, the members of the Group of Technical Experts have a duty to maintain the confidentiality of data and information submitted to them, even after the conclusion of their functions (LOS/PCN/L.41/Rev.1, para. 8). It was on the basis of that provision that each member of the group of experts was required to sign a letter from the Special Representative of the Secretary-General outlining their duty in the following terms:

> "The duty of the members of the Group of Technical Experts not to disclose confidential information constitutes both an obligation in respect of the individual's appointment for the purposes of the Preparatory Commission and a personal responsibility to the applicants. Members of the Group should take note that any breach of confidentiality may result in financial liability or other sanction and any member who has disclosed confidential information in breach of his duty may cease to exercise any function in relation to the receipt, custody or examination of confidential information and may be disqualified from being reappointed to exercise any such function."

15. As the matter now stands, the confidential data and information relating to the reserved area will form part of "the property and records" to be transferred to the Authority in accordance with paragraph 13 of resolution I, which states that: "The Commission shall remain in existence until the conclusion of the first session of the Assembly, at which time its property and records shall be transferred to the Authority." After the transfer of this confidential data and information concerning the reserved area, annex III, article 14, will then come into operation (for which see above).

16. The Preparatory Commission may wish to bear in mind that data relating to the area reserved for the Authority may have significant monetary value.

II. MATERIAL OF A NON-CONFIDENTIAL NATURE ADDITIONAL TO THAT PRESENTED IN THE REPORT CONTAINED IN DOCUMENT LOS/PCN/BUR/R.10, PROVIDED BY THE SECRETARIAT AT THE REQUEST OF THE GENERAL COMMITTEE

17. In their report contained in document LOS/PCN/BUR/R.10, in the introductory section (paras. 1-5), the Group of Technical Experts sets out, in general terms, the task to be accomplished in reviewing and evaluating the joint report of the three registered pioneer investors. As stated in paragraph 2 of the report, "The Group was convened to undertake a technical review of the preparatory work carried out by the three registered pioneer investors, namely IFREMER/AFERNOD, DORD and Yuzhmorgeologiya", in the context of the preparatory work to be completed before the activities of stage I of the exploration plan for one mine site in the area reserved for the Authority in the central region of the North-East Pacific, could begin. Such preparatory work and stages I and II of the exploration plan were identified in a previous report (LOS/PCN/BUR/R.5) of the Group of Technical Experts.

/...

18. Section I (paras. 6-12) of document LOS/PCN/BUR/R.10 outlines the preparatory work as envisaged by the Group.

19. In section II (paras. 13-18) of the report, the Group presents its review of the joint report of the three registered pioneer investors on the preparatory work. Section II.A (paras. 13-14) deals with the contents of the joint report; section II.B (paras. 15-16), data used in the preparatory work carried out by the three registered pioneer investors; and section II.C (para. 18), the output of such preparatory work.

20. In paragraph 13 of section II.A, the Group of Technical Experts states: "The (joint) report (of the three registered pioneer investors) is divided into four chapters. Chapter I describes the equipment and methods used by the three pioneer investors during the survey of the area (reserved for the Authority in the central region of the North-East Pacific). Chapter II presents the data acquired by the three pioneer investors. Chapter III describes the characteristics of the potential ore deposit and chapter IV contains recommendations for the future work."

21. In this context, the following additional material may be provided on the equipment and methods used by the three pioneer investors (this material could best be understood after reading paragraph 14 of LOS/PCN/BUR/R.10). 1/

Equipment and methods used by the pioneer investors

Research vessels. The pioneer investors used several vessels during the different phases of prospection in the areas reserved for the Authority. Three different vessels were used by IFREMER/AFERNOD - R.V. CORIOLIS, R.V. NOROIT and R.V. JEAN-CHARCOT. DORD used the R.V. HAKUREI-MARU No. 2. Yuzhmorgeologiya used research vessels of the R.V. Yuzhmorgeologiya class - YUZHMORGEOLOGIYA, AKADEMIK ALEXANDRE SIDORENKO and XVII SYEZD PROF-SOYUSOV.

Navigation systems. Satellite navigation systems including the transit satellite system and the Global Positioning System (GPS), and acoustic positioning systems were used by the pioneer investors.

Sampling methods. A variety of sampling methods was used by the pioneer investors - grabs and cameras, both the free-fall or "boomerang" types, and the types held by cables, and corers including box corers, piston corers and free-fall corers.

Bathymetric mapping methods. Both conventional echosounders (wide-beam and narrow-beam) and multi-beam echosounders were used by the pioneer investors for the purpose of bathymetric mapping. Multi-beam echosounders have the advantage of covering large areas in a relatively short period.

/...

Methods for studying nodule distribution on the sea floor and the underlying structure of the sea floor. Seismic reflection systems and sediment echosounders were used by the pioneer investors. The newly developed Multi-Frequency Exploration System (MFES) was used. MFES was specially developed in Japan for the study of the distribution of manganese nodules on the sea floor. The system processes the signals echoed from three different sounding sources emitted in three different frequency ranges pertaining to sub-bottom profilers (SBP), precision depth recorders (PDR) and narrow-beam sonars (NBS).

Survey systems. As the report of the three pioneer investors explained, measurements obtained from equipment held at the sea surface lack the necessary accuracy and resolution to display bottom features of less than a few tens of metres in width. Detailed exploration to assess the location of all possible obstacles to mining as well as the distribution and content of nodule fields, must rely upon more sophisticated systems. However, with most sophisticated systems currently available, the time needed to survey large areas is tremendously long and the cost very high, because (a) the width of the area surveyed along the track is very limited, and (b) the along-track speed of the system is very slow.

Five kinds of devices have been used by the pioneer investors: deep-towed devices for bottom photography; unmanned submersibles for photography; deep-towed side-scan sonars; deep-towed systems combining side-scan sonar, sediment echosounder, television and photographic devices; and deep-sea manned submersibles. The report of the pioneer investors stated that these devices were used to provide complementary information in a very limited area and sometimes outside the area reserved for the Authority. However, they brought considerable improvement in the understanding of the main features of a possible mining deposit, according to the report.

Methods for chemical analysis. All the samples collected were carefully recorded: number of pieces, dimensions, colour, shape, surface texture, etc. The samples were weighed by morphoscopic and size classes. Their internal structure was also recorded after cutting and polishing. By careful splitting, a representative part of the sample was extracted for chemical analysis. Different methods were used by the pioneer investors for chemical analysis. These include the potentiometric method, the atomic absorption method, and X-ray fluorescence analysis.

22. Furthermore, the following additional material may be provided on the description of the potential ore deposit (this material could best be understood after reading paragraph 17 of LOS/PCN/BUR/R.10).

/...

Description of the potential ore deposit

Geographic location. The area reserved for the Authority consists of three blocks, characterized as Block 1, Block 2 and Block 3, in the north Pacific Ocean between latitudes 11°30'N and 15°55'N and longitudes 128°35'W and 134°35'W. Block 1, the southwesternmost, covers an area of 8,937 square kilometres. Its longest north-south extent is 167 kilometres and its largest east-west width 81 kilometres. Block 2, the northwesternmost, covers an area of 38,899 square kilometres. Its maximum extent is 260 kilometres north-south, and 216 kilometres east-west. Block 3 covers an area of 23,734 square kilometres. Its maximum extent is 259 kilometres east-west and 111 kilometres north-south. Compared to their own dimensions, the three blocks are not far apart. The northern boundary of Block 1 is 111 kilometres from the southern limit of Block 2. The western border of Block 3 is 114 kilometres east of the northern part of Block 2. The diagonal distance between Block 1 and Block 3 is 415 kilometres. 2/

The nearest shoreline is Clarion Island, 1,600 kilometres from the eastern border of Block 3. Clipperton Island is 2,160 kilometres from the same block. The island of Hawaii is 2,340 kilometres from the northwestern corner of Block 2. The Marquesas Islands are 2,400 kilometres to the southwest. The nearest port is Honolulu, 2,640 kilometres from the northwestern corner of Block 2. San Diego is 2,230 kilometres to the northeast, Mazatlán is 2,520 kilometres to the east-northeast. The entrance to the Panama Canal is 5,360 kilometres to the southeast. Tokyo is 8,780 kilometres to the west-northwest. The average water depth in the area is 4,900 metres. 3/

Oceanographic and meteorological characteristics. As the report of the three pioneer investors stated, information on the climatology of the area reserved for the Authority came from a compilation of publicly available data as well as data acquired by the pioneer investors during their exploration cruises in the area reserved for the Authority and in neighbouring areas. The Clarion-Clipperton Area meteorological environment is typically tropical. Descriptions and certain details are presented with regard to a general overview of the climatology, winds and waves (winter and summer), currents (surface, subsurface-layer, intermediate-layer and bottom) and hydrology.

Biological characteristics. According to the report of the pioneer investors, information on the biology of the area reserved for the Authority came from a compilation of publicly available data as well as data acquired by the pioneer investors during their exploration cruises in the area reserved for the Authority and in its vicinity. The report further notes that the biological environment of the polymetallic nodule deposits is typically oligotrophic. Biological productivity is based on photosynthesis and its rate depends on the supply of nutrients. A major abrupt change in density at great depth makes the supply of biogenic elements to the surface difficult, resulting in a low biomass of primary production, in the presence of organisms of different trophic levels. Currently the production rate varies by season and runs from 100 to 200 milligrams of carbon per square metre (mg C/m^2) per day, according to the report.

Further information is provided in the report on the biology of the sub-surface layers (phytoplankton, bacterioplankton, zooplankton and fish and ichthyoplankton), and of the bottom layers (megabenthos, macrobenthos, meiobenthos, microbenthos and organisms living on the nodules).

Bottom geomorphology and sub-bottom geology. The Clarion-Clipperton ferromanganese area, within which lies the area reserved for the Authority, is in the north sub-equatorial part of the Pacific Ocean within the abyssal plain limited by the Clarion fracture zone to the north, the Clipperton fracture zone to the south, the Mathematician seamount to the east, and the Line Islands rise to the west. The length of the Clarion-Clipperton ferromanganese area is 4,000 kilometres, its width 600 to 800 kilometres, and the total surface is about 3 million square kilometres. Water depth varies from 4,200 metres in the east to 5,300 metres in the west. The western part from the Line Islands to longitude 130°W is a plain with highs and lows rising from 100 to 300 metres. The eastern part between longitude 115°W and 130°W is a gentle, sloping plain with some local reliefs east-west. Volcanic seamounts rise to 3,000 metres above the ocean bottom and form separate mountain ranges, determined by the presence of long fractures parallel to the Clarion and Clipperton transform faults. Within the area reserved for the Authority, the sea floor is formed by a sedimentary layer 100 to 300 metres thick resting on the oceanic crust. 4/

Further information is provided in the report of the pioneer investors on the basaltic substratum, the sedimentary layer (lithology and tectonics), the bottom morphology of the area reserved for the Authority and the mechanical properties of the uppermost sediment.

Polymetallic nodules. The report of the pioneer investors provides information about the polymetallic nodules in the area reserved for the Authority - nodule types, nodule fields and estimation of the resources.

23. Paragraph 18 of section II.C of LOS/PCN/BUR/R.10 describes the output of the preparatory work, as contained in the joint report of the three pioneer investors. The following additional material may be provided in connection with that paragraph.

It should be noted that with regard to the presentation of maps/summary data, the media and homogeneous formats were determined through consultations among the three pioneer investors. Thus, the data from the sample stations were presented in two types of media: printed lists (contained in the joint report) and magnetic recordings of strictly structured data files in text format (contained in the data diskette).

/...

> Cartographic data were presented in homogeneous formats using a standard type of projection referred to a given geoid (Mercator projection, ellipsoid WGS72) and graphic presentation conventions (isoline intervals, symbols). The unit for depth (maps 2.1-2.3) is metre, for abundance and standard deviation of abundance (maps 3-5) is kilogram per square metre (kg/m^2), for metal content (maps 6-10) percentage of nodule weight, for metal accumulation for manganese, i.e., metal content multiplied by abundance (map 11), kilogram per square metre (kg/m^2), and for metal accumulation for other metals, gram per square metre (g/m^2). 5/

24. In section III (paras. 19-24) of LOS/PCN/BUR/R.10, the Group of Technical Experts presents its review of the methodology used by the three pioneer investors in the preparatory work. Paragraphs 20 and 21 deal with the work of the three pioneer investors in examining and adjusting the information relating to sampling to ensure its consistency and homogeneity for the purpose of merging all the data. In this context, the following additional material may be provided at the end of paragraph 21 of LOS/PCN/BUR/R.10. 6/

> Each subset of data relating to sampling from a particular pioneer investor or a particular geographical zone was processed separately.
>
> As far as metal contents were concerned, the small differences observed among these subsets were compatible with the range of the statistical variance of the data. However, for averages of nodule abundance calculated from the data of a given pioneer investor in a given block, the IFREMER/AFERNOD values came out smaller than those measured by the two other pioneer investors.
>
> When considering these values observed in the different blocks, even when adjusted for statistical variance, the IFREMER/AFERNOD values appeared always smaller, whichever the block considered. Therefore, the low values could not be the result of a geographical concentration of the sampling in areas particularly poor in nodules. As the data of the two other pioneers were very similar, it was clear that IFREMER/AFERNOD had probably underestimated the abundance of the nodules at the bottom.
>
> The observations made to estimate the weight of nodules present on the bottom (which is a factor in the estimation of abundance) call for two classes of measurements, namely, those made on nodule samples and those made on the basis of bottom photography. Neither method is free from uncertainty, but they supplement each other and, in combination, afford a better assessment of nodule abundance for each observation station. However, on comparison with the results obtained by Yuzhmorgeologiya and DORD, it became apparent that the compensation algorithm (corrections used in comparing photographs of the seabed and mechanical sampling carried out at the same location in order to match the estimation of abundance) used by IFREMER/AFERNOD was too conservative and underestimated nodule abundance on the bottom. In order to be able to merge the data from the three pioneers, the French data thus needed to be adjusted.

Various methods of adjusting the measurements of nodule abundance on the bottom made by IFREMER/AFERNOD were discussed among the three pioneer investors. IFREMER/AFERNOD proposed the use of a data adjustment method used in geostatistics, Gaussian anamorphosis, subject to a number of checks to be conducted by specialists in these techniques. The French data were then adjusted using this method. (Gaussian anamorphosis involves comparison of the probability distributions of the observations for abundance obtained by the three pioneer investors respectively with the standard normal (Gaussian) probability distribution, and adjustment of the relative differences among the three probability distributions pertaining to the three pioneer investors in alignment with the Gaussian distribution.)

25. Paragraph 23 of section III of LOS/PCN/BUR/R.10 deals with the examination of bathymetric data by the three pioneer investors and the limitations of the bathymetric maps. In this context, the following additional material can be provided (this material is best understood after reading paragraph 23 of LOS/PCN/BUR/R.10).

This limitation of bathymetric maps in providing detailed local topography is exemplified when a comparison is made among the interpretations obtained by each pioneer investor of the same part of the area reserved for the Authority. While main features of the relief are present in the three maps prepared by the three pioneer investors respectively, such as a small seamount culminating at 4,500 metres in one instance, some details were missed by one pioneer investor or another. (This is a common problem because, inter alia, the sea floor tracks covered by different investigators can vary.)

26. In section IV (paras. 25-26) of LOS/PCN/BUR/R.10, the Group of Technical Experts presents the major conclusions contained in the joint report of the three registered pioneer investors. The conclusions pertain to quantity of nodules in the reserved area, percentage of sampling stations containing high abundance or high metal content and indications of some areas being more potential than others. The following additional material can be provided (this material is best understood after reading paragraph 25 of LOS/PCN/BUR/R.10).

However, the concentration of the information is not adequate to estimate the resources of each mineable field within the area reserved for the Authority. This is confirmed by geostatistical calculations using data from neighbouring areas. Thus, only a "global estimation" could be made of the in-situ resources of the whole of the area reserved for the Authority. (In "global estimation" (global in the sense that the whole of the relevant area is covered), the total amount of polymetallic nodules in the whole of the area reserved for the Authority is computed by multiplying the average abundance for the whole of the area reserved for the Authority by the total surface, i.e., 71,750 square kilometres; this method contrasts with the method of estimating the resources of

/...

specific parts of the whole area and adding those estimates to arrive at the total for the whole. The application of the latter method was not possible owing to the inadequacy of the concentration of information.)

27. The report of the Group of Technical Experts (LOS/PCN/BUR/R.10) includes conclusions and recommendation of the Group in the final section, section V (paras. 27-28). Figure 1 following that section presents two maps showing the location of the area reserved for the Authority in the central region of the North-East Pacific.

Notes

1/ The information in the paragraphs that follow is available in the public domain. See, in particular, documents LOS/PCN/BUR/R.1-8, R.11-14 and LOS/PCN/BUR/INF/R.1-11.

2/ The information in this paragraph may be found in document LOS/PCN/BUR/R.5, figure 1.

3/ The information in this paragraph is available in the public domain.

4/ The information in this paragraph is available in the public domain.

5/ The information in this paragraph may be found in document LOS/PCN/BUR/R.13.

6/ The information in the paragraphs that follow may be found in document LOS/PCN/BUR/R.13.

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.11
27 February 1992

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February - 13 March 1992

PERIODIC REPORT ON THE ACTIVITIES OF INDIA IN THE PIONEER AREA

(Submitted by the delegation of India)

1. Pursuant to resolution II of the Third United Nations Conference on the Law of the Sea, the statement on the implementation of resolution II of the Preparatory Commission of 5 September 1986 (LOS/PCN/L.41/Rev.1, Annex) and the statement of understanding on the implementation of resolution II of 10 April 1987 (LOS/PCN/L.43/Rev.1), the Department of Ocean Development, Government of India, Mahasagar Bhavan, Block 12, CGO Complex, Lodi Road, New Delhi - 11003, India has been registered as a pioneer investor and an area of 150,000 sq km allocated in the Central Indian Ocean Basin with the exclusive right to carry out pioneer activities in the said area. In accordance with the understanding on the fulfilment of obligations by registered pioneer investors and their certifying States (LOS/PCN/L.87 of 30 August 1990), each registered pioneer investor is required to submit an annual report to the Preparatory Commission on the type and extent of activities undertaken by it. In compliance with this requirement, the following report is furnished to the Preparatory Commission.

2. The Department of Ocean Development, which has been allocated a pioneer area in the Central Indian Ocean Basin, has been implementing a long-term multidisciplinary programme, which covers three distinct aspects, viz. (i) Exploration, (ii) Extraction of metals from nodules, and (iii) Design and development of a test deep seabed mining system.

Exploration

3. With the registration of India as a pioneer investor and the allocation of the pioneer area in the Central Indian Ocean Basin, the objective of the first phase of exploration was completed. During this phase all efforts were directed towards assessing the relative concentration and quality characteristics of nodules as well as the particular seabed topography on which these nodules rest. The survey work was executed through the National Institute of Oceanography, Goa. Engineers India Limited, New Delhi, provided the consultancy for exploration, planning and geostatistical resource evaluation.

/...

4. Following registration and allocation of the pioneer area, the strategy for refined exploration has been to progressively reduce the sampling grid intervals and to generate accurate bathymetric caps of the pioneer area leading to better visualization of the seabed topography from where the nodules are to be taken out. The work has been carried out mainly by employing the Indian research vessel ORV *Sagar Kanya*. Four cruises of ORV *Sagar Kanya* (154 ship days) were devoted to this purpose. Exploration and detailed bathymetric mapping of the pioneer area are currently being carried out with the aid of a multi-beam swath bathymetric system (hydrosweep system) which was procured and installed on ORV *Sagar Kanya* during the year 1990. About 75 per cent of the pioneer area has been mapped using the state-of-the-art technology. Oceanographic data on physical, chemical and biological parameters to obtain baseline information over a period on the time-dependent variables were collected. 9,000 line km echo-sounding, 12,500 line km magnetic, and 13,500 line km gravity data were collected. In addition, environmental data were collected at 13 stations and sediment sampling and dredging operations were also carried out. Intensive coring operations were also carried out for geostatistical studies of the seabed. High-resolution bathymetric maps of the pioneer area covered during these research cruises have also been prepared. Based on the spot sampling data generated at the National Institute of Oceanography, Goa, geostatistical evaluation has been carried out with periodic updating.

Extractive Metallurgy

5. The extraction processes for recovery of metal values from the nodules are being developed at the National Metallurgical Laboratory, Jamshedpur, the Regional Research Laboratory, Bhubaneswar and Hindustan Zinc Limited, Udaipur. About 15 process routes were initially investigated by these laboratories. An evaluation of the test results of these routes was made in early 1986 and five potential routes were shortlisted for further development on a laboratory scale. They were further reduced to the following three process routes which are currently under development for upscaling. These include:

- Roast reduction ammoniacal leach at National Metallurgical Laboratory, Jamshedpur;
- Ammonia SO_2 leach at Regional Research Laboratory, Bhubaneswar;
- Acid leach-pressure leach at Hindustan Zinc Limited, Udaipur.

The evaluation of test results and monitoring of the R&D activities are being carried out by Engineers India Limited, New Delhi. The investigations on the above routes are now at an advanced stage. Two pilot plants, each of about 250 kg nodules per day capacity, at National Metallurgical Laboratory and the Regional Research Laboratory are in the final stages of erection/modification. These plants are expected to be commissioned during 1992.

Design and development of the test deep seabed mining system

6. As a first step towards developing the various components of seabed mining technology, a study was commissioned to delineate the design concepts of various mining systems. The Central Mechanical Engineering Research Institute, Durgapur was identified as the main centre for research and development work in seabed mining technology with support and participation by public and private sector organizations like Bharat Earth Movers Limited, Bharat Heavy Electricals Limited, institutes of technology, etc. The first phase of the programme is aimed at developing a land based-cum-shallow basin prototype of a remote operated underwater nodule collector together with a lifting system. The nodule collector is expected to be first tested on land for its performance and remote operational capabilities. The lifting system

/...

will also be tested on an experimental test set-up. The performance of the combined system will be evaluated in a shallow basin.

7. The end of the R&D phase will be marked by a feasibility report for the semi-industrial phase, based on which the detailed engineering, procurement, installation and commissioning of the test mining system will be undertaken during the coming years.

Future programme

8. The activity profile of the programme during the next phase includes spot bottom sampling using free-fall grabs, dredging and collection of bulk samples, completion of multibeam swath bathymetric maps using the hydrosweep system, continuation of sea floor mapping of the seabed nodules covering sediment distribution, continuance of sea floor mapping of the seabed for its micro topography and local structures, geotechnical studies of nodules as well as associated sediments and oceanographic data collection. In the field of extractive metallurgy evaluation of pilot plant performance and design of semi-industrial plant, and in mining, testing of the collector, experimental studies on lifting systems, testing of integrated systems in shallow basins and evaluation of performance, are envisaged. These programmes are being periodically monitored at different levels. The Ocean Science & Technology Board and a Steering Group constituted by the Council of Scientific and Industrial Research periodically monitor and review the progress of the programme. In addition, Engineers India Limited has been given the task of monitoring and evaluating the progress of work from time to time.

/...

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.12
28 February 1992

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February-13 March 1992

PERIODIC REPORT ON THE ACTIVITIES OF DEEP OCEAN RESOURCES DEVELOPMENT CO., LTD. (DORD) IN THE PIONEER AREA

(Submitted by the delegation of Japan)

In accordance with paragraph 5 of the understanding on the fulfilment of obligations by the registered pioneer investors and their certifying States (LOS/PCN/L.87, annex) adopted on 30 August 1990, the Government of Japan, as certifying State, reports to the Preparatory Commission the following pioneer activities carried out by Deep Ocean Resources Development Co., Ltd. (DORD), the Japanese pioneer investor.

During the period from September 1990 to December 1991, DORD carried out exploration activities in the central region of the North-East Pacific, and follow-up research work on land.

The details of these activities are as follows:

1. Duration

(a) Cruising (depart from Honolulu and return to Honolulu in Hawaii).

Total: about 80 days (40 days in each FY 1990 and 1991)*

(b) Laboratory work on land

Total: about 6 weeks (3 weeks in each FY 1990 and 1991)

---

* FY (fiscal year) starts on 1 April and ends on 31 March of the following year.

/...

2. Area of exploration

The exploration area in FY 1990 and FY 1991 is bounded by lines joining the following turning points, the coordinates of which are listed below:

Turning points	Latitude (N)	Longitude (W)
1	15°39'	132°55'
2	15°39'	132°00'
3	15°45'	132°00'
4	15°45'	131°00'
5	15°20'	131°00'
6	15°20'	132°00'
7	14°40'	132°00'
8	14°17.4'	132°48'
9	14°17.4'	132°55'
1	15°39'	132°55'

3. Name of the research vessel and the number of scientists and crew engaged in the activities on the vessel

Research vessel: the Hakurei Maru No. 2

Scientists and crew:

about 50 persons including 15 scientists in each FY 1990 and 1991

4. Description of equipment and methods used

(a) Positioning

- Satellite navigation -

  Navy Navigation Satellite System (NNSS)

  Global Positioning System (GPS)

(b) Sea bottom topography and geological survey

- Acoustic sounding bathymetry topography -

  Precision depth recorder (PDR)

  Narrow beam sounder (NBS)

  Multi-beam echo sounder (MBES) - used only in 1991

- Sea bottom sound pressure -

  Multiple frequency exploration system (MFES)

- Sub-surface geologic structure -

  Sub-bottom profiler (SBP)

/...

- Sampling -

  Free-fall grab (FG)

- Analysis -

  Pre-treatment equipment (drying, crushing)

  X-ray fluorescent analyser (XFA)

(c) Sea bottom observation

- Photography -

  Free-fall camera (FC)

(d) Data recording and processing

- On-line and off-line functions -

  Data processing system (DPS)

(e) Laboratory work on land

- Chemical analysis of minor elements of manganese nodules
- Chemical analysis of marine sediments

5. Results of the past exploration activities

- Using the NBS and MBES, the seafloor topographic maps were drawn on a 1/200,000 scale with contour intervals of 20 m by means of on-line and off-line functions of the data processing system (DPS).

- Abundance maps of manganese nodules with contour intervals of 2.5 km/m^2 were drawn by means of MFES.

- On the basis of data obtained on manganese nodules using the FG, XFA, FC at each sampling point, the abundance map of manganese nodules, a grade map of nickel, copper, cobalt, manganese and iron as well as the metal quantity map were made.

- In order to determine characteristics of manganese nodules and chemical composition of marine sediments, detection of minor elements such as Pb, Zn, Y etc., was carried out as laboratory work on land.

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.12/Corr.1
4 March 1992

ENGLISH ONLY

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February-13 March 1992

PERIODIC REPORT ON THE ACTIVITIES OF DEEP OCEAN RESOURCES DEVELOPMENT CO., LTD. (DORD) IN THE PIONEER AREA

(Submitted by the delegation of Japan)

Corrigendum

Page 3, paragraph 5, line 7:

For 2.5 km/m^2 read 2.5 kg/m^2

/...

UNITED NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.13
2 March 1992
ENGLISH
ORIGINAL: FRENCH

PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February-13 March 1992

PERIODIC REPORT ON THE ACTIVITIES OF THE IFREMER/AFERNOD IN THE PIONEER AREA

(Submitted by the delegation of France)

1 September 1990-31 December 1991

Pursuant to paragraph 5 of the understanding of 31 August 1990 on the fulfilment of obligations by the registered pioneers and their certifying States (LOS/PCN/L.87, annex), a report is hereby submitted on the activities conducted by IFREMER/AFERNOD from 1 September 1990 to 31 December 1991 following the allocation by the Preparatory Commission of a 75,000 km sq preliminary activity sector in the North Pacific.

During this period, the work conducted by IFREMER/AFERNOD covered three fields of activity:

- exploration;
- nodule lifting;
- environment;

which will be successively reviewed below.

1. EXPLORATION

Part of the exploration activity carried out by IFREMER/AFERNOD focused on the conduct of the preparatory work for exploration of the site reserved for the Authority.

However, some work was also done on the data previously acquired on the preliminary activity site allocated by the Preparatory Commission.

1.1 Preparatory work on the site reserved for the Authority

Once notified of the understanding of 31 August 1990 on the fulfilment of obligations by the registered pioneer investors and their certifying States (LOS/PCN/L.87, annex), IFREMER/AFERNOD contacted the other two pioneer investors registered in the central North Pacific on 17 December 1987, namely Yuzhmorgeologiya in the Soviet Union and Deep Ocean Resources Development Co. Ltd. in Japan.

/...

At the same time, IFREMER/AFERNOD verified with the United Nations Office of Ocean Affairs and the Law of the Sea the accuracy of the coordinates for the points delimiting the various blocks of the site reserved for the Authority on which the exploration was to focus.

The first contacts established by mail made it possible to determine the media and formats in which the various types of data could be exchanged between the three pioneers. For the data from the sample stations, two types of media were agreed on: printed lists and magnetic recordings of strictly structured data files in text format.

For the cartographic data, a type of projection referred to a given geoid (Mercator, WGS 72), scales and graphic presentation conventions (isoline intervals, symbols) were also agreed upon.

This enabled each pioneer to extract the information available in its archives and present it in homogeneous formats. The data thus extracted related not only to the information obtained in the sectors which formed part of the original requests submitted by each pioneer to the Preparatory Commission, but also to the information each pioneer had been able to obtain, prior to the agreements on the settlement of disputes that might arise from overlapping applications, in the sectors which had formed part of the other two pioneers' applications and are now reserved for the Authority.

At the meeting held in Paris on 9 and 10 January 1991, it was thus possible to exchange data and conduct a first joint review. This review enabled a plan to be drawn up for the work to be carried out with a view to merging these data. A division of labour was defined and a timetable established.

IFREMER/AFERNOD was assigned responsibility for overall coordination of the work and for processing the data from the sample stations.

The first phase in the processing of the data from the sample stations was to verify the homogeneity of the available data. Statistical analyses employing a panoply of methods were applied to the data, with each subset from a given pioneer or a given geographical zone being processed separately. The data proved to be highly homogeneous, with the exception of the assessments made by IFREMER/AFERNOD of the measurements of nodule abundance on the bottom.

The observations made to estimate the weight of nodules present on the bottom call for two classes of measurements, those made on nodule samples and those made on the basis of bottom photography. Neither method is free from uncertainty, but they supplement one another and, in combination, afford a better assessment of nodule abundance for each observation station. However, on comparison with the results obtained by Yuzhmorgeologiya and Deep Ocean Resources Development, it became apparent that the compensation algorithm used by IFREMER/AFERNOD was too conservative and underestimated nodule abundance on the bottom. In order to be able to merge the data, the French data thus needed to be adjusted.

A second meeting of the three pioneer investors was held at Gelenzhik, the Yuzhmorgeologiya headquarters on the shores of the Black Sea (USSR), from 13 to 18 May 1991.

During this meeting, the various data acquisition methods employed by each of the pioneers were examined. Descriptions of the equipment and methods used were made available to IFREMER/AFERNOD so that it could prepare a summary description of them for inclusion in the first section of the report.

/...

best copy available

A new critical examination of the data was conducted, comparing the results obtained by each of the pioneers in analysing the data exchanged in January. The various methods of adjusting the measurements of nodule abundance on the bottom made by IFREMER/AFERNOD were discussed. IFREMER/AFERNOD proposed the use of a data adjustment method used in geostatistics, Gaussian anamorphosis, subject to a number of checks to be conducted by specialists in these techniques.

The outline of the final report was drawn up and the contribution of each pioneer to the drafting of the various chapters of the report and to the preparation of the summary maps was defined.

A meeting held with a representative of the United Nations Office of Ocean Affairs and the Law of the Sea made it possible to specify the conditions for delivery of the data bank of material from the sample stations.

During June, the feasibility study on adjustment by Gaussian anamorphosis was conducted by Geovariances International under a contract awarded by IFREMER/AFERNOD. The study proved satisfactory, and the adjusted data were accordingly incorporated in a single database covering all the sample station data from the three pioneer investors. On the basis of this body of data, IFREMER/AFERNOD utilized the arsenal of statistical and geostatistical methods to draw temporary conclusions with respect to the various parameters observed:

- Nodule abundance on the bottom expressed as wet nodule weight per unit of surface area (kg/m^2);

- Content of different metals - manganese, nickel, copper, cobalt, iron - in the nodules;

- Water content and specific weight of the nodules;

- Metal accumulation for manganese, nickel, copper and cobalt, expressing the weight of metal contained in the nodules per unit of surface area;

- Depth of the observation stations.

Maps showing isovalue curves could then be drawn, using computerized automatic mapping programmes, for different parameters:

- Nodule abundance on the bottom;

- Manganese, nickel, copper, cobalt and iron content;

- Manganese, nickel, copper, cobalt and iron metal accumulation.

To permit easier visualization of the results, IFREMER/AFERNOD used kriging to produce colour maps showing the variations in these parameters in the form of monochrome spots of a size equivalent to squares on the seabed with a side length of 2.5 km. To express the risk of error attached to these results by reason of the high local variability of some of these parameters, colour maps of the standard deviation of kriging were also drawn.

On the basis of these results, it was possible to draw up an estimate of the resources in tons of nodules on the bottom and tons of metal contained in the nodules.

A description of the various methods used in the preparatory work was drafted, and illustrated with diagrams and computer-generated graphics.

Lastly, a description of the various characteristics of the site reserved for the Authority was prepared on the basis of the contributions by the various pioneers.

The documents submitted by the different pioneers were filed on computer. Most of the diagrams were redrawn using computer-assisted design (CAD) programs. Assembly of the final report was started in mid-June 1991.

A third meeting of the three pioneer investors was held at Tokyo at the invitation of Deep Ocean Resources Development. During this meeting, the paste-up of the final report was presented by IFREMER/AFERNOD, and the different constituent documents were attentively reread, with the introduction of various corrections and improvements.

On returning to France, the representatives of IFREMER/AFERNOD incorporated all the corrections and finalized the report. Printing, assembly and binding of the 16 copies in English for the Preparatory Commission were completed in time for the report to be submitted to the Special Representative of the Secretary-General for the Law of the Sea before the end of the Preparatory Commission's summer session in New York.

A translation into French was then prepared and transmitted to the Special Representative of the Secretary-General for the Law of the Sea through the diplomatic channel at the beginning of October to complete the file.

1.2 Work performed on the data from the IFREMER/AFERNOD site

Over the same period, work continued on the data and samples collected in December 1988 in the course of dives carried out by the manned submarine Nautile at the preliminary activity site allocated to IFREMER/AFERNOD.

The various sediment samples taken in particular along the cliffs were analysed by the surface geochemistry laboratory at Strasburg (Professor Hoffert).

The major components were determined from smears studied under the microscope. It was thus possible to assess the volumetric proportions of the following components:

- clays
- siliceous organisms:
    - radiolaria
    - diatoms
    - sponge spicules
- calcareous organisms:
    - coccolites
    - discoasters
    - foraminifera
- iron and manganese hydroxides
- micronodules

/...

- volcanic glasses
- palagonite
- zeolites
- quartz.

X-ray studies made it possible to identify and assess the proportions of the various mineralogical constituents of the clay phase:

- smectites
- illites
- chlorites
- kaolinite.

The major and trace component content of the sediments was established by chemical analysis.

Micropalaentological measurements on radiolaria and foraminifera enabled deposition dates for the various formations to be proposed.

The basalt samples collected were studied under a petrographic microscope, and their chemical composition was analysed. A number of age determinations using radiochronology methods were also performed.

The nodules collected were subjected to precise measurement and chemical analysis. Microscopic and mineralogical study of them is under way.

The results of these studies are to be presented in publications which are in the course of preparation.

On quite another level, IFREMER/AFERNOD transferred the database built up since the beginning of its prospecting work (1970) to a more modern computerized medium which can be more easily consulted by a computerized network.

At the same time, the archives assembled over its 20 years are in the course of restructuring in order to facilitate subsequent access to them. The most important information will be incorporated into a computerized information management system.

2. LIFTING

During this period, the work carried out in collaboration with the German company Thetis Technologie on the construction and trials of a vehicle for testing the bottom propulsion system and the collection of nodules continued.

It appears, following feasibility studies on the exploitation of polymetallic nodules conducted by IFREMER/AFERNOD from 1984 to 1989, that such exploitation might be profitable under metal marketing conditions similar to those which permit the exploitation of impoverished laterite deposits on land. The requisite technology is available. Nevertheless, it is essential to test and enhance the reliability of the components used close to the bottom, which have to withstand high pressures (500 bars) in a low-temperature (2°C) corrosive liquid environment.

The experimental vehicle that is under development moves on tracks. It comprises a frontal collection system using jets of pressurized water to

/...

detach the nodules from the sediment while avoiding the intake of too much sediment. The lifted nodules are emptied into a hopper. This feeds a drum crusher which breaks them up. During the tests, the nodules will be ejected onto the bottom behind the vehicle.

The vehicle will be lowered to the bottom by and powered through an optical-fibre cable linking it to the surface vessel. The cable will afford capability for continuous monitoring of operations and for operating the stop and start controls and adjusting the various pieces of equipment. This simple set-up can thus be operated by a standard oceanographic vessel.

The assistance of a manned submarine such as the Nautile is required to check the results obtained (overall performance of the vehicle, collection rate, traction tests, etc.). The Nautile will communicate the images collected by high-cadence sonics (improved sonic impulse transmission system at a rate of one image every two seconds).

Accurate positioning of the vehicle on the bottom necessitates the development of a new short-based positioning system which will be carried on board the surface vessel.

The vehicle is to be operated in a testing area located in the preliminary activity sector allocated to IFREMER/AFERNOD.

3. ENVIRONMENT

In association with the Soviet Union (Yuzhmorgeologiya) and Germany (Thetis International, Federal Institute for Geosciences and Raw Materials, University of Hamburg), a survey has been conducted of current knowledge of deep seabed exploitation systems and their possible impact on the environment.

It is already apparent that the current level of knowledge of benthic ecology is insufficient to permit accurate analysis of the consequences of operations close to the bottom. International cooperation is required in order for any real progress to be made in this field. However, the remoteness of the prospect of industrial development of nodule exploitation leaves time to acquire this knowledge.

It has, however, been possible to ascertain that in 25 years the operations will cover only a very small part of the areas currently allocated (a few thousand kilometres distributed over several hundred thousand square kilometres) and at a rate which will still remain below 30 per cent of the surface area, thus limiting environmental impact. In addition, means of eliminating possible harmful effects can already be envisaged - for example, reducing the quantity of sediment displaced by using jets of water to detach the nodules, monitoring the sediment plume ejected onto the bottom, re-injecting the cold water and fine particles that reach the surface below the zone of intense biological activity.

The study of macrofauna and signs of life being carried out by a biologist on the basis of the bottom photographs collected by IFREMER/AFERNOD has continued. A thesis on this work is to be defended in 1992. The study will make it possible to analyse the associations of fauna and the behaviour of the sessile or motile animals living on nodule-bearing bottom areas in relation to density of the nodules, their different facies, the presence of slight currents and the proximity of relief features.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.14
6 March 1992
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February-13 March 1992

PERIODIC REPORT ON THE ACTIVITIES OF YUZHMORGEOLOGIYA IN THE PIONEER AREA

(Submitted by the delegation of the Russian Federation)

Over the period 31 August 1990-1 January 1992, Yuzhmorgeologiya did not conduct regular geological and geophysical research aimed at further strengthening the network and enhancing the stability of the study of ferromanganese nodules in the sector allocated to it. This was because the technical and economic studies carried out by our experts on the economic feasibility of industrial exploitation of nodules showed that, given the long-term trend in nickel and cobalt prices of +3-5 per cent and the development of highly productive extraction technology capable of yielding an annual productivity of 3 million tons a year per vessel and resolving the environmental problems associated with industrial extraction, it can be asserted with a high degree of probability that industrial extraction of ferromanganese nodules in the Clarion-Clipperton zone cannot begin before the year 2010.

On the basis of these assessments, the efforts of our researchers over the reporting period have concentrated on correlation and statistical analysis of the information already obtained, verification of certain general trends throughout the Clarion-Clipperton zone, technical and economic studies of the feasibility of industrial extraction of ferromanganese nodules, and selection and study of the monitoring zones required for the conduct of environmental experiments.

Total expenditure on these activities was $US 850,000, including:

1. Geostatistical investigations, 1990-1991 - $US 150,000
2. Technical and economic studies, 1990-1991 - $US 200,000
3. Study of background characteristics of the monitoring zone, 1990-1991 - $US 50,000

/...

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.14/Corr.1
10 March 1992

ARABIC, CHINESE, ENGLISH,
FRENCH AND SPANISH ONLY

PREPARATORY COMMISSION FOR THE INTERNATIONAL
SEABED AUTHORITY AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Tenth session
Kingston, Jamaica
24 February-13 March 1992

PERIODIC REPORT ON THE ACTIVITIES OF YUZHMORGEOLOGIYA IN THE PIONEER AREA

(Submitted by the delegation of the Russian Federation)

Corrigendum

In subparagraph 3, replace $US 50,000 by $US 500,000.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.20
2 March 1993
ENGLISH
ORIGINAL: CHINESE

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY AND
FOR THE INTERNATIONAL TRIBUNAL FOR
THE LAW OF THE SEA
Eleventh session
Kingston, 22 March-2 April 1993

PERIODIC REPORT ON THE ACTIVITIES OF THE CHINA OCEAN MINERAL RESOURCES RESEARCH AND DEVELOPMENT ASSOCIATION (COMRA) IN THE PIONEER AREA

(Submitted by the delegation of China)

1. Pursuant to paragraph 5 of the understanding on the fulfilment of obligations by the registered pioneer investor, COMRA, and its certifying State, the People's Republic of China (LOS/PCN/L.102, annex), a report is hereby submitted on the activities conducted by COMRA, following the allocation by the Preparatory Commission of a 150,000 square kilometres exclusive pioneer area in the north-eastern Pacific.

2. COMRA, which has been allocated a pioneer area between Clarion and Cliperton Fracture Zone in the north-eastern Pacific, has worked out and been implementing a long-term programme, which covers the following three distinct aspects: (i) exploration; (ii) design and development of a test deep seabed mining system; (iii) studies on processing techniques. Besides, research items on fundamental geology relating to exploration and exploitation as well as comprehensive items in association with the overall research and development activities are included in the plan specifically worked out for the implementation of the long-term programme.

Exploration

3. In 1992, exploration was undertaken by R/VHAIYANG4, which started its ocean survey in June and completed in November 1992. The total area surveyed was about 35,150 square kilometres, with the coordinates between 8 52.5'-11 22'N and 151 7.5'-153 22.5'W in the western part of the pioneer area. The strategy for refined exploration is to progressively reduce the sampling grid intervals and to generate accurate bathymetric chart of the pioneer area, with emphasis on the evaluation of mining area and defining the possible mining

/...

site. Therefore, during last year's cruise, the items conducted included geological sampling, ocean bottom photography, CTD measurement, geophysical survey and in situ measurement and analysis, etc.

Design and development of a test deep seabed mining system

4. In view of the present technological level in China and the trend of development in deep seabed mining technology the world over, and in consideration of the mining approach and operational environment, emphasis of our work last year, according to the research needs of ore collection and lifting as well as their remote operational system, was placed on working out and demonstrating respectively the associated plans. Laboratory studies on different plans have already been started.

Studies on processing techniques

5. The present work in extractive metallurgy is devoted to making comparative studies on several processes in laboratory.

Studies on ore dressing techniques include: (i) the technique for special processing of polymetallic nodules; and (ii) the study on high efficiency flotation agent.

Apart from the above studies, some studies relating to mineralogy have also been conducted.

Items for fundamental geological study

6. Geological studies will be carried out along with the exploration in the pioneer area. The items investigated include: the studies on the regulation of distribution and mechanism of formation of polymetallic nodules; the composition of polymetallic nodules and sediments as well as geochemistry; and the methods for exploration, resources evaluation as well as evaluation of the environmental impact. Work on demonstration of the plan and the defining of research items was finished last year.

Items for comprehensive study

7. In order to coordinate the deep seabed mining activities of China and aimed at deep seabed mining system and criterion which are being established and gradually perfected the world over, COMRA is developing the technical criterion for both exploration at sea and laboratory analyses and test, preparing standard samples, establishing database of ocean mineral resources, conducting market projection for future supply and demand of metals and establishing economic model for the exploitation of polymetallic nodules.

Future programme

8. Priority will continue to be given to the exploration in the remained part of the pioneer area during the future period, maintaining the work of reducing the intervals of sampling stations and grids with a view to determining the

/...

mining area. It is attempted to relinquish part of the pioneer area at the time when the first phase of exploration is completed. Meanwhile, laboratory studies of mining, processing as well as the studies of making comparisons among various plans will progressively be conducted to determine the rational and feasible plan for further study.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.21
2 March 1993
ENGLISH
ORIGINAL: CHINESE

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
Eleventh session
Kingston, 22 March-2 April 1993

EXPLANATION OF THE DATABASE DISKETTE FOR THE RESERVED AREA OF THE INTERNATIONAL SEABED AUTHORITY AS REQUIRED OF THE PIONEER INVESTOR

(Submitted by the delegation of China)

1. Pursuant to paragraph 8 of the understanding on the fulfilment of obligations by the registered pioneer investor, the China Ocean Mineral Resources Research and Development Association (COMRA), and its certifying State, the People's Republic of China (LOS/PCN/L.102, annex), COMRA provides free of cost the computerized database diskette for samples collected in the area reserved for the Authority to the Preparatory Commission.

2. To this end, COMRA provides a 3.5 inch MS/DOS formatted diskette which contains database for sampled stations in format dBase. All the explanatory notes in the diskette are in English.

3. The diskette was edited on the basis of the available data collected by China in the area reserved for the Authority, including:

(i) All the data of the stations in the reserved area included in the Application of the Government of the People's Republic of China for registration of the China Ocean Mineral Resources Research and Development Association as a pioneer investor under the resolution II of the Third United Nations Conference on the Law of the Sea;

(ii) Data of the stations acquired by China in the reserved area after Application was forwarded; and

(iii) Data of the water depth acquired by China in the reserved area.

/...

4. For the purpose of utilization and verification, the data of part "i" was edited in the same order of the Application document, followed by the data of parts "ii" and "iii" in the form of supplements. The data of part "iii" was edited in additional form.

5. The number of stations in the reserved area of 150,000 square kilometres increased from 205 to 236, and with the addition of some data of water depth in the reserved area.

6. In evaluation of the estimated commercial value of the reserved area, the total reserved area of 150,000 square kilometres was divided into five sectors based on the sectors examined and approved by the Group of Technical Experts. The contents of Cu, Ni, Co, Mn, abundance and the amounts of the resources in each of the sectors was re-examined by statistical methods in order to reflect the possible variation of the amounts of resources in each sector after the addition of supplemented data.

7. It was found there was no substantial changes of the contents of Cu, Ni, Co, Mn, the abundance and the amounts of the resources in the total reserved area after the addition of supplemented data as compared with those in the Application.

8. Based on all available data obtained and the extent of work conducted by COMRA in both the pioneer and reserved areas, it was shown that both the pioneer and reserved areas have equal estimated commercial values. This evaluation was conducted only on the basis of the available data at this stage.

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.22
23 March 1993
ENGLISH
ORIGINAL: FRENCH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Eleventh session
Kingston, Jamaica
22 March-2 April 1993

PERIODIC REPORT ON THE ACTIVITIES OF THE IFREMER/AFERNOD IN THE PIONEER AREA

Submitted by the delegation of France

1 January-31 December 1992

Pursuant to paragraph 5 of the understanding of 31 August 1990 on the fulfilment of obligations by the registered pioneers and their certifying States (LOS/PCN/L.87, annex), a report is hereby submitted on the activities conducted by IFREMER/AFERNOD from 1 January 1992 to 31 December 1992, in the 75,000 km sq preliminary activity sector in the North Pacific allocated to France by the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea.

During this period, very little work was done by IFREMER/AFERNOD, because economic conditions were not propitious for the immediate development of industrial exploitation. The research conducted covered four fields of activity:

- exploration;
- nodule lifting;
- environment;
- training of future staff of the Authority,

which will be successively reviewed below.

/...

1. EXPLORATION

Exploration activity by IFREMER/AFERNOD was limited to some work on the data previously acquired on the preliminary activity site allocated by the Preparatory Commission.

Study continued of data and samples collected in December 1988 during diving operations at the preliminary activity site allocated to IFREMER/AFERNOD with the manned submarine Nautile.

The study primarily involved reinterpretation of images from the sea-beam sonar and the sediment profiler collected in 1986 using the autonomous submarine, in the light of information obtained from submersible dives.

It was thus possible to identify most of the levels visible on the acoustic recordings and to define their petrography and their stratigraphic age.

Several theories could thus be formulated regarding both the sedimentary history and the structural behaviour of these formations. However, these interpretations provide more questions than answers to the problem of nodule genesis. It therefore seems that it will be necessary to return to the sites already studied and attempt to eliminate the remaining uncertainties with the help of additional observations and samplings made with greater precision as regards topography. The results of this work are to be presented in publications which are in the course of preparation.

IFREMER/AFERNOD has also continued to transfer the database built up since the beginning of its prospecting work (1970) to a more modern computerized medium. The new base became operational during the year.

This new database has made it possible to rethink earlier estimates of nodule abundance on the bottom. A systematic re-examination of bottom photographs and of nodule samples lifted confirmed the hypotheses formulated during the study of data from the site reserved for the Authority. The underestimation of nodule abundance is mainly due to an over-cautious estimate of the area covered by nodules on the photographs.

The size of the nodules partially buried under sediment had been underestimated. In addition, the tumuli visible on the photographs had been considered as areas without nodules. In fact, these tumuli are due to the activity of worms buried in the sediment, which after ingestion eject fine particles which cover the nodules and make them invisible.

The necessary corrections have been made to the data from the preliminary activity site allocated to France by the Preparatory Commission.

/...

The data from outside the site reserved for the Authority and outside the French preliminary activity site still have to be corrected.

Archiving of the information collected over the last 20 years has also continued, as has the systematic scanning of the scientific articles which make up the bibliographical database.

2. LIFTING

During this period, the work carried out in collaboration with the German company Thetis Technologie on the construction and trials of a vehicle for testing the bottom propulsion system and the collection of nodules continued.

Two optical-fibre cable elements were constructed using different manufacturing techniques. Following mechanical and telemetric testing one of the cables was selected. These land-based tests were supplemented by tests at sea. The cable has to carry power of 20 kW at a voltage of 2 kV. The specifications of the interfaces and devices for data transmission by optical cable (telemetry) were also established.

Work also continued on the definition of the sensors needed for the monitoring of operations. The method selected will make it possible to measure the depth of penetration of the vehicle in the sediment (very-high-resolution acoustics). The level to which the hopper is filled could be determined by measuring the attenuation of the light transmission in an optical-fibre sensor. A Doppler acoustic system would be used to measure the output flow of collecting equipment. A study has been completed of the system for monitoring and regulating the movement of the collector and a demonstration model has been prepared on computer.

However, this programme had to be halted in November 1992 because of financial difficulties experienced by the German company. This cooperation is currently being reorganized and will no doubt be geared to the development of techniques for deep-seabed operations which are not specific to nodule lifting but could, in due course, be used for lifting.

3. ENVIRONMENT

The study of macrofauna and signs of life carried out by a biologist on the basis of the bottom photographs collected by IFREMER/AFERNOD has been completed. A thesis on this work was defended in July 1992 before the Science Faculty of the University of Brest. It provides valuable information on associations of fauna and on the behaviour of the sessile or motile animals living on nodule-bearing bottom areas in relation to the density of the nodules, their different facies, the presence of slight currents and the proximity of relief features. However, an analysis of photographs alone proved inadequate for the precise determination of species and for the understanding of certain behavioural phenomena.

/...

4. TRAINING

Following the recommendation made by the Training Panel of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea, in August 1992, at the second part of the tenth session of the Preparatory Commission, the General Committee selected three trainees to receive the training proposed by France:

- Mr. Ahmed Braham, a national of Tunisia, for training in mineral geology,
- Mr. Kaiser Gonçalves de Souza, a national of Brazil, for training in mineral geology,
- Mr. Mamadou Ndiaye, a national of Senegal, for training in geophysics and data processing.

Despite the late selection of the trainees, it was possible to invite Mr. Braham to France for the academic year 1992-1993. In November 1992, he came to the Centre d'Enseignement Supérieur en Exploration et Valorisation des Ressources Minérales (CESEV) of the Ecole Nationale Supérieure de Géologie Appliquée at Nancy. During this 10-month training period, Mr. Braham will receive training on subsoil databases at the Bureau de Recherches Géologiques et Minières (BRGM). He will then go to IFREMER to study the mineral geology of nodules and to work more specifically on databases and data processing methods for the evaluation of deposits.

Mr. Gonçalves de Souza, who is receiving training in Germany until May 1993, has agreed that his training should be postponed to October 1993. He too will follow courses at CESEV. He will receive training at IFREMER and, in particular, will participate in the campaign for the exploration of the site reserved for the Authority, if this is compatible with the schedule for sea campaigns (currently being prepared).

The programme for Mr. Ndiaye's training will commence in October 1993. He will participate with Mr. de Souza in the campaign for the exploration of the site reserved for the Authority.

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.23
25 March 1993

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Eleventh session
Kingston, Jamaica
22 March-2 April 1993

PERIODIC REPORT ON THE ACTIVITIES OF THE DEEP OCEAN RESOURCES DEVELOPMENT CO., LTD. (DORD) IN THE PIONEER AREA

(Submitted by the delegation of Japan)

During the period of the year 1992, DORD carried out exploration activities in the central region of the North-East Pacific, and follow-up research work on land.

The details of the activities are as follows:

1. Duration.

   (a) Cruising (depart from Honolulu and return to Honolulu, Hawaii); about 40 days;

   (b) Laboratory works on land; about 3 weeks.

2. Area of exploration.

The exploration area in 1992 is located within the pioneer area bounded by lines joining the following turning points, the coordinates of which are listed below:

/...

Turning points	Latitude (N)	Longitude (W)	Turning points	Latitude (N)	Longitude (W)
1	11° 00'	149° 15'	16	10° 22.5'	146° 32'
2	11° 00'	148° 30'	17	10° 07.5'	146° 32'
3	10° 48.75'	148° 30'	18	10° 07.5'	146° 45'
4	10° 48.75'	147° 30'	19	9° 37.5'	146° 45'
5	11° 00'	147° 30'	20	9° 37.5'	146° 30'
6	11° 00'	147° 00'	21	9° 22.5'	146° 30'
7	10° 45'	147° 00'	22	9° 22.5'	146° 00'
8	10° 45'	146° 45'	23	8° 45'	146° 00'
9	11° 00'	146° 45'	24	8° 45'	147° 44.8'
10	11° 00'	146° 07.5'	25	10° 00'	147° 44.8'
11	11° 03.75'	146° 07.5'	26	10° 00'	148° 30'
12	11° 03.75'	145° 48.75'	27	10° 15'	148° 30'
13	10° 11.25'	145° 48.75'	28	10° 15'	149° 30'
14	10° 11.25'	146° 15'	29	10° 45'	149° 30'
15	10° 22.5'	146° 15'	30	10° 45'	149° 15'
			1	11° 00'	149° 15'

3. Name of the research vessel and the number of scientists and crew engaged in the activities on the vessel.

Research vessel: the Hakurei Maru No. 2
Scientists and crew: about 50 persons including 15 scientists

4. Description of equipment and methods used.

(a) Positioning

- Satellite navigation -

Navy navigation satellite system (NNSS)
Global positioning system (GPS)

(b) Sea bottom topography and geological survey

- Acoustic sounding bathymetry topography -

Multi-beam echo sounder (MBES)

- Sea bottom sound pressure -

Multiple frequency exploration system (MFES)

- Subsurface geologic structure -

Sub-bottom profiler (SBP)

/...

- Sampling -

Free-fall grab (FG)

- Analysis -

Pre-treatment equipment (drying, crushing)
X-ray fluorescent analyzer (XFA)

(c) Sea bottom observation

- Photograph -

Free-fall camera (FC)

(d) Data recording and processing

- On-line and off-line functions -

Data processing systems (DPS)

(e) Laboratory work on land

- Chemical analysis of minor elements of manganese nodules -
- Chemical analysis of marine sediments -

5. Results of the past exploration activities.

- Using the MBES, the seafloor topographic maps were drawn on a 1/200,000 scale with contour intervals of 20m by means of on-line and off-line functions.

- Abundance maps of manganese nodules with contour intervals of 2.5 Kg/m were drawn by means of MFES.

- On the basis of data obtained on manganese nodules using the FG, XFA and FC at each sampling point, the abundance map of manganese nodules, a grade map of nickel, copper, cobalt, manganese and iron as well as the metal quantity map were made.

- In order to determine characteristics of manganese nodules and chemical composition of marine sediments, detection of minor elements such as Pb, Zn, Y etc., was carried out as laboratory work on land.

/...

UNITED
NATIONS

LOS

Distr.
RESTRICTED

LOS/PCN/BUR/R.24
25 March 1993

ORIGINAL: ENGLISH

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Eleventh session
Kingston, Jamaica
22 March-2 April 1993

PERIODIC REPORT ON THE ACTIVITIES OF INDIA IN THE PIONEER AREA

(Submitted by the delegation of India)

1. Pursuant to Resolution II of the Third United Nations Conference on the Law of the Sea, the Statement on the Implementation of Resolution II of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex) and the Statement of Understanding on the Implementation of Resolution II of 10 April 1987 (LOS/PCN/L.43/Rev.1) the Department of Ocean Development, Government of India, India has been registered as a pioneer investor and an area of 150,000 sq. km allocated in the Central Indian Ocean Basin with the exclusive right to carry out pioneer activities in the said area.

In accordance with the Understanding on the fulfilment of obligations by registered pioneer investors and their Certifying States (LOS/PCN/L.87 of 30 August 1990), each registered pioneer investor is required to submit an annual report to the Preparatory Commission on the type and extent of activities undertaken by it. In compliance with this requirement the Department of Ocean Development, Government of India submitted the first report to the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea during the Tenth Session held in Kingston, Jamaica (document LOS/PCN/BUR/R.11 dated 27 February 1992).

/...

The present report covers the details of the activities undertaken during the year 1992-93.

2. The pioneer activities relating to polymetallic nodules, as indicated in the previous report, cover three distinct activities, viz. (i) exploration, (ii) extraction of metals from nodules, and (iii) design and development of a test deep seabed mining system.

(i) Exploration

The exploration work in the pioneer area was continued through the National Institute of Oceanography, Goa by deploying the research vessel ORV Sagar Kanya. Two cruises - 67 ship days - were devoted for this purpose. During these cruises detailed bathymetric data in the pioneer area, with the aid of a multibeam swath bathymetric system (hydrosweep system), was collected. 8,000 line km echosounding, gravity data for 13,700 line km and magnetic data for 12,200 line km were also collected. Environmental data was collected from three different locations.

Bathymetric maps for the area covered during these cruises were prepared on the basis of the data generated. Slope angle maps of part of the area were also generated. The post process software was modified to average and combine the data from previous cruises to generate a single map of the area.

The Engineers India Limited, New Delhi continued to provide consultancy for exploration, planning and geostatistical resource evaluation.

(ii) Extractive metallurgy

Research and development on the extraction processes for recovery of metal values from nodules was continued at the National Metallurgical Laboratory, Jamshedpur, the Regional Research Laboratory, Bhubaneswar and Hindustan Zinc Limited, Udaipur. A process following the roast reduction ammonical leach route was developed at the National Metallurgical Laboratory, Jamshedpur, scaled up 100 kg of nodules per day and a pilot plant commissioned. Three pilot plant campaigns for obtaining material and energy balance were completed at National Metallurgical Laboratory, Jamshedpur.

A pilot plant of 150 kg nodules per day capacity based on the sulphur dioxide leach route was commissioned at the Regional Research Laboratory, Bhubaneswar. Three campaigns were completed during the year and data gaps and problem areas were identified. On the basis of these trials improvements and firming up of the design parameters are envisaged.

The process package currently under development at the Hindustan Zinc Limited, Udaipur, is based on acid leach - pressure leach route. The process parameters have been optimized to ensure enhanced recovery of cobalt and

/...

minimize acid consumption. These will be reinvestigated for further refinement in the next phase.

The Engineers India Limited, New Delhi continued to monitor the research and development work at these laboratories as well.

(iii) Design and development of a shallow basin test mining system

The work on design and development of a shallow basin test seabed mining system was continued at the Central Mechanical Engineering Research Institute, Durgapur. The system designed by the Central Mechanical Engineering Research Institute consists of four sub-systems, viz. (a) collector unit (b) the nodule lifting system (c) a robotic manipulator, and (d) a shallow basin test facility. As a part of the implementation of the first phase of the project a prototype of remotely operated collector unit and a lifting system have been designed and developed and the system has been tested in a shallow basin specially constructed for the purpose. During the next phase of the project improvements in the design and development of the system will be carried out.

Future programme

The activity profile of the next phase includes spot sampling at closer grids, dredging and collection of bulk samples, collection of data on environmental, physical, chemical and biological parameters, geotechnical studies of nodules as well as associated sediments. In the field of extractive metallurgy pilot plant campaigns will be continued at National Metallurgical Laboratory, Jamshedpur and Regional Research Laboratory, Bhubaneswar. Laboratory scale studies in respect of acid leach - pressure leach route at Hindustan Zinc Limited are expected to be completed.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.25
26 March 1993
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
Eleventh session
Kingston, Jamaica
22 March-2 April 1993

PERIODIC REPORT ON THE ACTIVITIES OF YUZHMORGEOLOGIYA IN THE PIONEER AREA

(Submitted by the delegation of the Russian Federation)

1 January to 31 December 1992

In accordance with the obligations assumed by the pioneer investors and their certifying States (LOS/PCN/L.87), a report is hereby submitted on the activities conducted by Yuzhmorgeologiya from 1 January to 31 December 1992 on the question of ferromanganese nodules, including those in the 75,000 km sq sector in the North Pacific allocated to Russia by the Preparatory Commission.

During this period, work by Yuzhmorgeologiya was reduced considerably, because economic conditions were not propitious for the development of industrial mining. The research conducted covered three fields of activity:

- Development and testing of new deep-sea technologies,
- Exploration,
- Environmental protection.

1. Development and testing of new deep-sea technologies

As part of Russia's national programme for the creation of new marine technologies for the comprehensive scientific study of the ocean, including its mineral resources, a new model was made of the deep-sea (maximum of

/...

6,000 metres) towed sonar system, including the dual-frequency side-scan sonar, high-resolution parametric profiler and echosounders.

An important technical innovation in this system is the correction in real time of the acoustic images of the ocean bed in order to take into account the geometry of the beams and the speed of the vessel. This system conducted tests in the Mediterranean during the UNESCO "Tredmar" programme's scientific expeditions and is being marketed for potential customers.

In addition, the drafting stage was completed for the design of a multi-function vessel, which can perform the following tasks:

- Experimental work on the test mining of ferromanganese nodules, polymetallic sulphides and cobalt-manganese crusts;
- Deep-sea drilling;
- Lifting of sunken equipment.

In view of the complicated economic situation in Russia, the significant cost of the project and the fact that the prospects for industrial mining of ferromanganese nodules will, in the opinion of scientists, not take place until the years 2010-2015, the Government of Russia has decided to suspend work on this project.

2. Exploration

The exploration activities of Yuzhmorgeologiya were limited to work on the data collected during the preparation of the site. This work consisted of the reprocessing and comprehensive interpretation of all data collected by Yuzhmorgeologiya in the Clarion-Clipperton Area. In this connection, particular attention was paid to the joint processing of photo-television and hydro-acoustic data, which permitted the rezoning of the ferromanganese nodules in the light of different characteristics and, above all, of morphology.

In addition, the joint interpretation of sonar images and high-resolution seismic acoustics made it possible to establish more precise geomorphological profiles.

On the basis of a statistical analysis of the data collected in the Clarion-Clipperton Area and in other seas, we established the factors governing the process of ferromanganese ore genesis in the ocean. These factors can be divided into three groups:

- "Exogenous" factors connected with external, including planetary, forces: solar energy, gravitation and rotational strain, biological activity, washing away of terrigenous matter from the land;

- "Endogenous" factors caused by the internal forces of the Earth: tectonic, magmatic and hydrothermal processes; transformations of the substance and structure of the sedimentary thickness, of the ocean bed and of the deeper geospheres, under the influence of the thermal field and of fluid flows.

The third category consists of specifically "oceanic" factors directly connected with the ocean's water mass, its structure, hydrochemistry and hydrodynamics. Among the "exogenous" factors, the most clearly apparent are the following:

- sublatitudinal climatic zonality;
- circumcontinental zonality.

The principal "endogenous" factors include:

- influence of the ocean bed (its composition, age and geodynamics);
- volcanism and hydrothermal exhalation activity, thermal mass transfer;
- influence of the thermal field on the composition, hydrochemical characteristics and temperature of bottom water and infiltration water;
- structural, tectonic and morphostructural characteristics of the ocean bed and of its relief areas.

The group of "oceanic" factors includes:

- hydrochemical structure of the ocean water mass, its vertical zonality formed under the influence of the carbonate system, the oxygen and silica contained in the water;
- hydrodynamic characteristics of the ocean water mass (circulation flows);
- bioproductivity;
- sedimentation processes;
- diagenetic transformation of bottom sediments;
- hydrodynamics of bottom layers of the ocean water mass.

These factors, depending on the extent of their influence, control three levels of organization of the products of ferromanganese ore genesis:

- planetary;

/...

- regional;
- local.

At the planetary level, "exogenous" factors predominate; at the regional level, all three types of factor are involved; at the local level, the role of the "endogenous" factor increases.

3. Environmental protection

1992 saw the continuation of the ecological experiments in the Clarion-Clipperton Area commenced in 1991 in cooperation with NOAA (USA). The main result of the experiments is that, using the disturber specially constructed by American scientists and the Yuzhmorgeologiya vessel and the necessary equipment, a process has been initiated which replicates mining of ferromanganese nodules, with release of silt and other admixtures 10 to 20 metres from the bottom. Simultaneously, the consequences of this activity were studied within various time frames.

Prior to the beginning of the experiment, in 1991, detailed studies were made of the relief, morphology, hydrophysical characteristics and other relevant parameters of the site of activity. The main focus of the work was the establishment with the help of the disturber of the sedimentation "plume", which would immediately cover the inhabited area of the benthos, measuring two kilometres, with continual decrease of the thickness of the redeposited sediments from 10 to 1 mm. A total of 1,621.6 metric tons of silt were pumped in 44 towing operations, giving an average of 36.9 metric tons of silt for each operation. In the first third of the towing zone, less pumped sediment was observed than in the remaining two thirds.

The four sediment traps lifted after 20 towing operations revealed that the sediment had not migrated as far as we had thought previously and the data from the Neil Brown probe showed that the sedimentation "plume" spreading to the north from the towing zone contained lower concentrations of suspension: from 1 to 5 mg/1. It was therefore decided to lower the bathymetric level for suspension release from 30 to 15 metres; this was done, in order to enable the sediment to be pumped more rapidly and thus redeposited more efficiently.

Four types of technical method were used to fix the suspension "plume" in the bottom layers of the water mass and to map its position on the bottom: Neil Brown probing, sampling by means of sediment traps and X-ray analysis of sediment samples.

The sounding using a Neil Brown probe was done on three profiles: the first after 20 towings of the disturber from south to north, crossing the "disturbed" sector, and the second and third after 37 towings. Measurements by transmission meter revealed the presence of suspension at stations NN 5, 6, 7 and 8 with very low concentrations: 0.1 to 0.2 mg/1, but it was nevertheless possible to determine the border of the cloud of suspension and the direction in which it was developing. This occurred at the edge of the disturbed sector on the very bottom and, as it moves away, the cloud rises horizontally, increasing in height. The direction of movement is northerly, which confirms the data concerning bottom currents. Rosette bathymeters selected water samples in a "clean" bottom layer and also in the middle and at the lower border of the cloud of suspension.

In two sounding profiles done parallel to the axis of the disturbed sector, the concentration of suspension was higher than in the first profile. This demonstrates the frontal displacement of the suspension "plume" in a northerly direction.

In the period from 16 to 22 May, all the sediment traps were lifted from the bottom; the amount of sediment ranged from 50 to 307 mg. An analysis was made with the help of an optical backscatter (OBS). Re-evaluation of these data, taking into account the thickness of the redeposited sediments, reveals sizes ranging from 0.03 mm to 0.21 mm - in other words, much lower than had been assumed. This is the result of the movement of the sediment flow to the north of the towing zone.

An X-ray analysis of the sediment samples conducted between 16 and 24 May reveals considerable heterogeneity of the redeposited material. The nature of the sediments redeposited by the disturber varies structurally from very thin layers and lenses measuring 0.4 mm to larger ones measuring 2 mm. The structure of the surface layer consists of separate aggregates measuring from 8 to 12 mm. On the basis of these data, it was decided to make a sampling within the most disturbed sector.

In order to evaluate the short-term effect of the redeposited sediments on microbiological, macrofauna and meiofauna communities and also in order to make a chemical analysis of their habitat, samples were taken using a multi-corer at 16 stations.

In many samples there were signs of redepositing which we assume are the result of the passage of the disturber. We hope to answer these questions more accurately after an analysis of samples for radionuclides and X-ray tests.

Chemical analyses of porous samples from the multi-corer and of bottom water showed that, after the passage of the disturber in the bottom layer of water mass (0-50 m from the bottom), the concentration of silic acid considerably increases. We assume that this is because, after the disturbance of sediments, an excess amount of dissolved silic acid is released into the bottom layer; the concentration in the water found in sediment pores is three to five times greater than in the bottom layer. In the surface layer of the sea water, there are minimal amounts of biogenic elements and heavy metals. But the concentration of silic acid, nitrites and phosphates in the sediment pore water increases sharply at the bottom of the column. The elements contained in the pores of the water-filled sediments are of particular interest. The concentration of biogenic elements increases sharply and this appears to be linked with the results of the activity of organisms found there previously. The highest concentrations of copper are found in the pores of

/...

the upper layer (0.0-5.0 cm) of the sediments. The pattern of distribution of other metals is more complex and requires more detailed study.

From 20 to 23 May, we set up stations to measure currents around the BIE studied segment at eight points. Arrays of measuring devices to monitor currents were set up in such a way as to permit study of flow patterns at a distance ranging from 5 to 300 metres from the bottom. The measurement of current vectors will be carried out before the beginning of the second stage of BIE-92 work, i.e., over a period of about three and a half months, and will provide material for the construction of a hydrodynamic model of a BIE polygon.

The disturber was used to create a powerful disturbance of the benthic ecosystem and the consequences will have to be studied over a number of years. Box corers, multi-corers, probes, sediment traps, current meters, transponders and transmission meters were all set up and worked well, with no loss of equipment, and we are confident that they have provided reliable data for the study of the model showing the influence of future mining of the deep-sea environment.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.30
2 September 1993
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED
AUTHORITY AND FOR THE
INTERNATIONAL TRIBUNAL FOR
THE LAW OF THE SEA

PERIODIC REPORT ON THE ACTIVITIES OF THE INTEROCEANMETAL JOINT ORGANIZATION (IOM) AND ITS CERTIFYING STATES IN THE PIONEER AREA FROM AUGUST 1992 TO JULY 1993

(Submitted by the delegation of Poland)

In accordance with the annex to document LOS/PCN/L.108, entitled "Understanding on the fulfilment of obligations by the registered pioneer investor, the Interoceanmetal Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, the Republic of Poland and the Russian Federation", dated 20 August 1992, the first periodic report on the activities of IOM for the period 20 August 1992 to 30 June 1993 is submitted herewith.

Activities for the reporting period focused on the following areas:

- Correlating the results of regional geological and geophysical studies of the site reserved for IOM;
- Conducting research into the development of technologies for deep-sea mining and the metallurgical processing of polymetallic nodules;
- Developing, adopting and implementing an IOM training programme for the Preparatory Commission;
- Conducting negotiations with other pioneer investors and potential applicants to identify possibilities and conditions for cooperation in exploring and developing specific sites in the Clarion-Clipperton zone;
- Preparing a computerized database on the site reserved for the Authority.

/...

I. CORRELATION OF THE RESULTS OF REGIONAL GEOLOGICAL AND GEOPHYSICAL STUDIES OF THE SITE RESERVED FOR IOM

During the period under review, IOM conducted no geological and geophysical or oceanographic and ecological field studies. The Joint Organization focused its efforts in this area on interpreting and analysing previously gathered data on site "B", reserved for IOM, and the related activities may be summarized as follows:

- Studying the mutability of the relief profile and the international classification system, the composition and the physical and mechanical properties of bottom sediments, and producing layouts for a series of special 1:500,000-scale maps depicting the mining and geological conditions in the area where the proposed mining of polymetallic nodules is to take place;
- Studying the variability in the specific gravity of the polymetallic nodules and the parameters defining their commercial concentrations, preparing 1:500,000-scale maps of nodule abundance and content of the main metals in the light of corrected data produced by photographic sampling, photographic remote profiling, multi-frequency profiling, hydroacoustics and other measurements, and, on this basis, identifying ore sites, along with the elements for classifying them by geological and geomorphological conditions, physical and mechanical properties of bottom sediments and nodule genotypes;
- Analysing the oceanographic and ecological research carried out on a small scale in tandem with regional geological and geophysical research, with an assessment of the possibility of using this research to identify reference conservation areas and reference areas of influence.

The conclusion of this work is planned for 1993, and will enable IOM to obtain the following results:

- Identifying ore sites on which initial detailed geological and geophysical, as well as oceanographic and ecological research may be carried out, and developing the methodology for such research;
- Identifying the optimal type and scope of geophysical, geological, geochemical, hydrophysical, hydrochemical and hydrobiological research for a detailed study of the ore sites and reference conservation and influence areas;
- Identifying and preparing specific topics for cooperation and proposals on cooperation with other pioneer investors and potential applicants, primarily in the area of ecology and related, in particular, to the selection and joint study of unified reference areas for conservation and influence, and to the conduct of ecological field work, etc.

/...

II. RESEARCH INTO THE DEVELOPMENT OF TECHNOLOGIES FOR DEEP-SEA MINING AND THE METALLURGICAL PROCESSING OF POLYMETALLIC NODULES

In the area of the development of technologies for deep-sea mining and the metallurgical processing of polymetallic nodules, IOM, during the period under review, concentrated on analysing the results of work carried out by specialized organizations of the certifying States in the course both of the technical competitions held at a previous stage by IOM, for designs of these technologies, and of the corresponding contractual work commissioned by the Joint Organization. In this process. particular attention was given to the following primary tasks:

- Ascertaining precise initial data necessary for the development of deep-sea mining technology on the basis of materials gathered in the course of regional geological and geophysical work carried out by IOM in the pioneer area;
- Developing reliable criteria for the purposes of assessing and comparing the various proposed designs of the equipment in question (such as designs for the deep-sea mining of nodules using different types of floating platforms, collectors, hydraulic or mechanical lifting systems, etc., designs for metallurgical processing equipment based on hydro- and pyrometallurgy);
- Assessing the potential environmental impact and minimizing it through the use of various designs for deep-sea mining technologies;
- Updating technical and economic calculations of the efficiency of polymetallic nodule extraction, by defining more precisely the parameters used in these calculations to represent the technologies listed above.

III. DEVELOPMENT, ADOPTION AND IMPLEMENTATION OF AN IOM TRAINING PROGRAMME FOR THE PREPARATORY COMMISSION

During the period under review, IOM prepared a draft training programme and submitted it to the Preparatory Commission. During the eleventh session in Kingston, after certain corrections and refinements had been made, the IOM training programme was approved by the Training Panel and by the General Committee (LOS/PCN/TP/1993/CRP.12/Rev.1).

The training is designed to draw on the scientific and technological potential offered by IOM and the specialized organizations of the certifying States in the following disciplines: geophysics - one trainee; marine ecology - one trainee; metallurgical engineering - two trainees.

Successful applicants will, in accordance with the note verbale submitted to the Preparatory Commission (LOS/PCN/BUR/R.27), undergo training for a period of 10 months, commencing in September or November 1994, in leading scientific research institutes and training centres attached to industrial institutions and factories of IOM participating countries.

/...

Preparatory work is currently under way in IOM to bring the syllabuses of the different areas of the training programme in line with the syllabuses followed in the training organizations of IOM participating countries.

IV. NEGOTIATIONS WITH OTHER PIONEER INVESTORS AND POTENTIAL APPLICANTS TO IDENTIFY POSSIBILITIES AND CONDITIONS FOR COOPERATION IN EXPLORING AND DEVELOPING SPECIFIC SITES IN THE CLARION-CLIPPERTON ZONE

This cooperation arises from the need to join forces in exploring and developing deposits of polymetallic nodules with a view to reducing costs while simultaneously enhancing the effectiveness of research.

The first and as yet only organization with which IOM has established such a relationship is the China Ocean Mineral Resources Research and Development Association (COMRA), the pioneer investor from China. In May 1993, talks were concluded on cooperation until 1996 in the area of scientific and technical information exchange, the participation of IOM and COMRA specialists in research cruises in each other's specific sites, and in conducting the laboratory simulation of processes for the underwater collection and lifting of polymetallic nodules.

V. PREPARATION OF A COMPUTERIZED DATABASE ON THE SITE RESERVED FOR THE AUTHORITY

Work has commenced on the preparation of computer disks containing a database on the site reserved for the Authority, in accordance with paragraph 8 of the annex to document LOS/PCN/L.108.

/...

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.31
31 January 1994
ENGLISH
ORIGINAL: FRENCH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Twelfth session
Kingston, Jamaica
7-11 February 1994

PERIODIC REPORT ON THE ACTIVITIES OF THE IFREMER/AFERNOD IN THE PIONEER AREA

Submitted by the delegation of France

1 January-31 December 1993

Pursuant to paragraph 5 of the understanding of 31 August 1990 on the fulfilment of obligations by the registered pioneers and their certifying States (LOS/PCN/L.87, annex), a report is hereby submitted on the activities conducted by IFREMER/AFERNOD from 1 January 1993 to 31 December 1993, in the 75,000 km sq preliminary activity sector in the North Pacific allocated to France by the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea.

During this period, the amount of work done by IFREMER/AFERNOD was limited, because economic conditions were not propitious for the immediate development of industrial exploitation. Technological monitoring was conducted in order to keep abreast of changes in seabed-related technology. In addition, IFREMER/AFERNOD made an essential contribution to the organization and success of the training of the three trainees provided for under the above-mentioned agreement of 31 August 1990.

Training of future staff of the authority

The three trainees selected by the General Committee of the Preparatory Commission on the recommendation of the Training Panel either concluded or commenced their training in France:

/...

- Mr. Ahmed Braham, a national of Tunisia, arrived in France in November 1992 for training in mining geology. He went first to the Centre for Higher Education in the Exploration and Exploitation of Mineral Resources (CESEV) at the Ecole nationale supérieure de géologie appliquée at Nancy to participate in the training programme organized by that body. In May 1993 he was able, as part of that training, to attend a course on the subsoil database of the Office of Geological and Mining Research in Orleans. He then attended the IFREMER research centre at Brest from 1 July 1993 to acquaint himself with the characteristics of deep-seabed deposits, the methods of exploration used in prospecting them and the technologies contemplated for their exploitation. During this period, he conducted a personal study on the evaluation of the resources in the Clarion-Clipperton zone, based on information taken from IFREMER/AFERNOD database. In the course of this work, he employed specialized software for the geostatic processing of mining data on a computer workstation and a microcomputer. Mr. Ahmed Braham's training concluded, very satisfactorily, in September 1993;

- Mr. Kaiser Gonçalves de Souza, a national of Brazil, began his training in mining geology in October 1993 when he reported to CESEV at the Ecole nationale supérieure de géologie appliquée at Nancy. In April 1994 he will go to the IFREMER research centre at Brest to complete his training in the geology of deep-seabed deposits, the methods of exploration used in prospecting them and the technologies for their exploitation;

- Mr. Mamadou N'Diaye, a national of Senegal, arrived in France at the beginning of October 1993 for training in geophysics and data processing. He went first to the Ecole nationale supérieur du pétrole et des moteurs at Rueil-Malmaison to attend a course focusing on the use of mathematical methods in geophysics. Upon completion of this course, which will end at the beginning of February 1994, he is to report to the IFREMER centre at Brest to complete his training in the geophysical methods used in the exploration of the seabed. He will also be instructed in the characteristics of the polymetallic nodule deposits, exploration methods other than geophysical ones and the technologies which should make it possible to exploit these deposits.

The last two trainees will participate in a seabed mapping exercise using multibeam sounders.

/...

UNITED NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.32
1 February 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Twelfth session
Kingston, Jamaica
7-11 February 1994

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA

CONTENTS

	Paragraphs	Page
Letter of transmittal		225
INTRODUCTION	1 - 6	227
A. Mandate	1 - 3	227
B. Methodology	4 - 6	227
I. REVIEW OF THE STATE OF DEEP SEABED MINING	7 - 20	228
A. India	7 - 9	228
B. Deep Ocean Resources Development Co., Ltd. (DORD) - Japan	10 - 12	228
C. IFREMER/AFERNOD - France	13 - 14	228
D. Yuzhmorgeologiya - Russian Federation	15 - 16	229
E. China Ocean Mineral Resources Research and Development Association (COMRA) - China	17 - 19	229
F. Interoceanmetal Joint Organization (IOM) - Poland	20	229

/...

CONTENTS (continued)

	Paragraphs	Page
II. ASSESSMENT OF THE TIME WHEN COMMERCIAL PRODUCTION FROM THE DEEP SEABED MAY BE EXPECTED TO COMMENCE	21 - 54	230
A. Factors	21 - 41	230
1. Structural changes	21 - 23	230
2. Technology	24 - 26	230
3. Regulatory regimes	27 - 29	231
4. Demand	30 - 36	231
5. Supply	37 - 40	232
6. Cost of deep seabed mining	41	233
B. Analysis	42 - 54	234
1. Development of land-based and deep seabed resources	42 - 45	234
2. Stages and time required	46 - 54	234
III. CONCLUSIONS	55 - 57	235

/...

LETTER OF TRANSMITTAL

28 January 1994

Dear Mr. Chairman,

In accordance with the mandate contained in paragraph 12 of document LOS/PCN/L.87 (annex), we, the members of the Group of Technical Experts, were convened to review the state of deep seabed mining and make an assessment of the time when commercial production might be expected to commence.

The Group met between 26 and 28 January 1994 at United Nations Headquarters in New York and held six meetings.

We regret that five members of the Group, Mr. Alfredo Jose da Silva Netto (Brazil), Mr. Igor Sergeevich Gramberg (Russian Federation), Mr. Naphtali Ndiritu Kamundia (Kenya), Mr. Luis G. Preval Paez (Cuba) and Mr. Zhang Bingxi (China), were unable to attend this meeting.

The Group of Technical Experts would like to thank you and the Preparatory Commission for the opportunity to assist in the discharge of the Commission's mandate. The Group also wishes to thank the staff of the Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, for its assistance at the meetings.

Yours sincerely,

Signed in New York on 28 January 1994:

Samuel Sona BETAH
(Cameroon)

Alfredo José DA SILVA NETTO
(Brazil) - absent

Igor Sergeevich GRAMBERG
(Russian Federation) - absent

Knut S. HEIER
(Norway)

Mr. José Luis Jesus
Chairman of the Preparatory Commission
for the International Seabed Authority
and for the International Tribunal for the
Law of the Sea
New York, New York

/...

Hicuunga H. E. KAMBAILA
(Zambia)

Naphtali Ndiritu KAMUNDIA
(Kenya) - absent

Jean-Pierre LENOBLE
(France)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

Luis G. PREVAL
(Cuba) - absent

David W. PASHO
(Canada)

Toshio SAKASEGAWA
(Japan)

T. R. P. SINGH
(India)

ZHANG Bingxi
(China) - absent

/...

INTRODUCTION

A. Mandate

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the Statement of Understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex).

2. In accordance with the mandate contained in paragraph 12 of document LOS/PCN/L.87, annex, we, the members of the Group, were convened to review the state of deep seabed mining and make an assessment of the time when commercial production might be expected to commence.

3. The Group met from 26 to 28 January 1994 and held six meetings.

B. Methodology

4. In discharging its mandate, the Group took into account the following information notes: "Current status of deep seabed mining and its future prospects" submitted by the Department of Ocean Development (India); "Status and perspectives of the exploitation of deep seabed deposits", submitted by IFREMER/AFERNOD (France); "Analysis of present status and future perspectives of deep seabed mining", submitted by the Russian Federation; "State of deep seabed mining and its future prospects", submitted by Deep Ocean Resources Development Co., Ltd. (DORD) (Japan); and the submission by the Ministry for the Protection of the Environment, Natural Resources and Forestry (Poland). The Group also took into account the annual periodic reports submitted by the six registered pioneer investors, providing information on the activities undertaken, being carried out currently and planned for the future by them.

5. Going beyond the information originating from the registered pioneer investors, the Group drew upon the experience, expertise and knowledge of its members as well as the relevant documents of the Preparatory Commission regarding the state of deep seabed mining, the state of land-based mining, the world metal's market and its future prospects and the relative role in the future world market of the two sources of supply.

6. After an exchange of information and analysis, the Group deliberated upon the topics at hand. The Group found it useful to identify and elaborate upon various factors that might have a bearing on the future prospects of deep seabed mining. After such identification and elaboration, the Group made an in-depth analysis of the implications of various factors in the framework of future supply and demand and in terms of time requirements before commercial production from deep seabed could take place. Such analysis then led the Group to come to certain conclusions regarding its review of the state of deep seabed mining and the assessment about the time when commercial production from the deep seabed might take place.

I. REVIEW OF THE STATE OF DEEP SEABED MINING

A. India

7. After the registration of India as a pioneer investor, exploration activities have continued with the use of improved technologies. These have included sea floor mapping of the entire area (150,000 km^2) using a multi-beam swath bathymetric mapping system called Hydrosweep, sampling of polymetallic nodules at closer grids, geotechnical studies and collection of baseline environmental data in addition to gravity and magnetic data.

8. As a first step towards the development of various components of deep seabed mining technology, a design and development programme has been initiated. The first phase of the programme, aimed at the development of a polymetallic nodule collector system for testing on land and in a shallow basin, has been completed. The second phase of the programme covers the design of a collector unit, studies of hydraulic and airlift systems, development of a remotely operated vehicle for pipeline inspection, waterproofing, development of an electrical/hydraulic component for underwater use, a hydraulic nodule pick-up system and an instrumentation and control system, etc.

9. In the field of extractive metallurgy, 3 of the 15 processing routes for extraction of metals have been selected for upscaling. The campaigns at the upscaled levels are in progress.

B. Deep Ocean Resources Development Co., Ltd. (DORD) - Japan

10. Exploration work has been carried out by collecting polymetallic nodules, conducting chemical analyses of the nodules and compiling detailed topographic data. Exploration work will be continued. The research and development project of the mining system has been carried out since 1981 and a comprehensive ocean test is planned to take place in 1996 for obtaining efficient and sufficient data and information for future commercial deep seabed mining.

11. The project entailing metal recovery from polymetallic nodules has been carried out since 1989.

12. Baseline environmental investigations were begun in 1991. Using the data from these investigations, a model will be elaborated which will enable the estimation of the environmental impact on the ocean, including its ecosystem.

C. IFREMER/AFERNOD - France

13. Following the result of the pre-feasibility study carried out from 1984 to 1989, IFREMER/AFERNOD took the decision to reduce its activities and limit them only to the fulfilment of its obligations under resolution II and a general monitoring of the situation.

14. This monitoring included the revision and compilation of all acquired data, the reorganization of the databases and a continuous survey of the evolution of the metals market and the world economy.

/...

D. Yuzhmorgeologiya - Russian Federation

15. Since August 1990 Yuzhmorgeologiya has not conducted regular geological and geophysical research aimed at further enhancing the study of polymetallic nodules in the sector allocated to it because it was concluded that there was a high degree of probability that industrial extraction of nodules in the Clarion-Clipperton zone could not commence before the year 2010.

16. Research efforts have concentrated on correlation and statistical analysis of the information already obtained: verification of certain general trends throughout the Clarion-Clipperton zone, technical and economic studies of the feasibility of industrial extraction of nodules and selection and study of the monitoring zones required for the conduct of environmental experiments.

E. China Ocean Mineral Resources Research and Development Association (COMRA) - China

17. COMRA is in the process of implementing a long-term programme focusing on exploration, design and development of a deep seabed mining system and of processing techniques. Other investigations are being conducted to compare planning options and to develop market projections for future supply and demand of metals as well as to establish an economic model for the exploitation of polymetallic nodules.

18. Priority is being given to exploring the remaining part of the pioneer area with a view to reducing the intervals between sampling stations as well as the grids used in order to identify the deep seabed mining area. Efforts include developing the technical criteria for both exploration at sea and laboratory analyses and testing, preparing standard samples, and establishing a database. Survey work includes geological sampling, bottom photography and geophysical surveys.

19. Research is being carried out on ore collection and lifting, including a remote operational system. The current work in extractive metallurgy is devoted to carrying out comparative studies on several processes in the laboratory and studies on ore dressing techniques, such as the technique for special processing of polymetallic nodules and the study on high-efficiency flotation agents.

F. Interoceanmetal Joint Organization (IOM) - Poland

20. Activities of IOM have focused on the following areas: correlation of the results of regional geological and geophysical studies of the site reserved for IOM; research into the development of technologies for deep seabed mining and the metallurgical processing of polymetallic nodules; and preparation of a computerized database on the site reserved for the Authority.

II. ASSESSMENT OF THE TIME WHEN COMMERCIAL PRODUCTION FROM THE DEEP SEABED MAY BE EXPECTED TO COMMENCE

A. Factors

1. Structural changes

21. The global political and economic changes that have occurred during the last few years have already had an important impact on the supply and demand balance of all the metals contained in polymetallic nodules. As a consequence, there has been a sharp decline in the prices of those metals.

22. The evolution during the next few years of the production and consumption rates of metals which could be obtained from the mining of deep seabed polymetallic nodules is very uncertain. In countries which had a centrally planned or controlled economy, production costs often did not reflect the true costs and could not be considered competitive in the long term in a market-oriented economy. Changes will also occur on the consumption side from the present decrease in the defence sector and the expected increase in the consumer goods sector.

23. There will also be an impact on the cost of production of many operations as many countries adopt regulations based on their social and environmental policy objectives. In addition, it must be noted that a general attitude of both governmental and private bodies is emerging to restrict the level of funding for activities which may only provide a return in the long term.

2. Technology

24. In the field of exploration, direct sampling devices - both visual and acoustic - have been adequately developed and are used by various companies and institutions; they are commercially available. However, the technology needs to be upgraded to be able to support the commercialization of the deep seabed polymetallic nodule programme. The sea-floor mapping systems need to produce high-resolution data while achieving relatively higher tow speeds but with a minimum of interference from turbulence and background noises. Some of these areas require further development, including miniaturization of multi-beam electronics, telemetry systems including composite optical/electrical cable systems, methods of towfish stabilization, efficient *in situ* geotechnical measuring devices, etc.

25. In the field of deep seabed mining, two of the three basic design concepts have been abandoned or shelved: the continuous line-bucket dredge and the shuttle system. The system envisaged and developed in parts includes the collection of polymetallic nodules by either a towed or a self-propelled collector, and the lifting of nodules through a 5-km-long vertical riser pipe utilizing a centrifugal pump or an air lift. However, an integrated mining system, even on a pilot scale of long duration, has not yet been demonstrated. The collector system, to be operational in a high-pressure and low-temperature environment while operating on soil of poor strength, demands special equipment components and material which need to be tested in the actual deep seabed environment. The development of an integrated mining system that would be

operational in an actual deep seabed environment on a sustained basis is demanding both in terms of time and effort and requires substantial financial inputs.

26. In the field of extractive metallurgy, metal extraction has been achieved by hydro-metallurgy as well as by pyro-metallurgy. A large number of processing routes have been developed for recovery of the three as well as the four metals contained in polymetallic nodules. However, these processes have been tested on a rather small scale, varying from tens of kilograms to hundreds of kilograms per batch. While there does not appear to be any major gap in the processing technology, the results available are not adequate for upscaling and use in feasibility study estimates. It is, however, recognized that the process development work may well be completed at a relatively accelerated speed should such a situation arise.

3. Regulatory regimes

27. When making an investment decision, investors will need to carefully evaluate the implications of conducting exploration and development under the relevant regulatory regime. Considerations would include such factors as taxation/revenue sharing, the complexity of the regulatory regime and the potential for delay and uncertainty. In general, the more onerous the deep seabed regime the less attractive the investment climate will be and the less likely that there will be a positive decision to invest.

28. In the case of the deep seabed mining regime, some potential problems, such as the uncertainty that would have resulted from overlapping claims, have been resolved. Similarly, the entry into force of the Convention adds certainty to the situation. Also, the process for the registration and approval of the claims of the pioneer investors by the Preparatory Commission seems to be efficient and helps to promote confidence in the administration of the regime.

29. The Group wishes to draw the attention of the Preparatory Commission to the importance of the environmental protection provisions of modern regulatory regimes. In the case of land-based mining, the approach to integrating environmental and economic objectives in a regulatory regime is cited by the mining industry as a significant factor that influences their investment decisions. This part of the deep seabed mining regime has yet to mature and there are many details and procedures to be worked out. There remains the potential for the regime to be developed in a manner that will promote investment or discourage it.

4. Demand

30. All the four metals of primary interest in polymetallic nodules, i.e. copper, cobalt, nickel and manganese, are of strategic significance. The relative importance of polymetallic nodules may vary from one country to another depending on the land-based resources at their disposal.

31. The current level of world consumption of these metals is on the order of the following magnitude:

Metal	Annual consumption (millions of tons)
Manganese ore	23.50
Nickel	0.65
Copper	10.80
Cobalt	0.02

(Source: Information note on "Current status of deep seabed mining and the future prospects", submitted by the Department of Ocean Development (India).)

32. It is difficult to predict long-term growth in consumption since that depends on a variety of factors. Demand may be enhanced by speedier industrialization in developing nations. On the supply front, the equations may be disturbed by the discovery of new resources and/or the use of substitution and recycling. The steel sector, being the main consumer of manganese and nickel, has witnessed a decline in the use of these metals owing to the fact that they are being replaced by other materials. Much of the decrease in the intensive use of nickel in the developed world has resulted from the substitution of plastics in cratings, containers and automobile parts and its replacement in some stainless steel-making processes. Other possible substitute materials include aluminium, crated steel, titanium, platinum, cobalt and copper.

33. There are no currently acceptable substitutes or replacements for cobalt, but some of its uses may be reduced by the substitution of ceramics.

34. In the case of copper, reduction in its use may be caused by design changes which conserve materials, increase the efficiency of its use and its substitution by aluminium, plastics and optical fibres.

35. The global political changes during the last few years have had a distinct impact on the demand for metals that are likely to be produced from deep seabed nodules. There has been a decrease in demand for metals in the defence sector. Nickel consumption in the Western world fell sharply during 1992 because of lower defence spending and the world-wide recession.

36. The centrally planned economies of Eastern Europe have been opened to market economy forces and a tremendous readjustment is occurring in all industries which is reducing the consumption of primary commodities. Metal and mineral inventories are being built up, which also affects metal prices.

5. Supply

37. Potential sources of supply of copper, nickel, cobalt and manganese minerals from the land in several countries, particularly developing countries, remain unknown to the present day for a number of reasons, two of which appear most important. Owing to financial constraints there is the problem of lack of

/...

capacity as well as capability to conduct sustained government geological survey programmes that could lead to the discovery of commercially viable mineral deposits. There is then the problem of unstable and unattractive fiscal and legal frameworks that make it difficult for such countries to attract high-risk and competitive investment capital and to guarantee predictable returns on investment capital were a decision to be made to exploit the mineral deposits on a commercial basis. As further work is undertaken by many countries to guarantee investor confidence by promoting private-sector initiative in the search for mineral deposits from the land, there is every likelihood of discovering mineral deposits outside the known traditional land-based mining areas, thus increasing the supply sources. However, their commercial exploitation, as is the case with the deep seabed minerals, will depend on the extent to which operational costs compare competitively with the corresponding world cost curves of existing operations.

38. The Group noted the importance that scientific investigation has for the development of deep seabed mining, because it represents the advance of human knowledge and the exercise of human intelligence.

39. The Group recognized that it was difficult to obtain complete knowledge of a deposit of polymetallic nodules. This is attributable to the great number of factors that have a bearing on their formation: the component minerals and their formation processes, the environmental characteristics and the influence of natural forces, temperature, pressure, magnetic and electrical fields, and movements of the earth's surface, which influence the creation, morphology, composition, quantity, etc., of polymetallic nodules.

40. The efforts undertaken by the first pioneer investors were also acknowledged. They have made an important contribution to scientific knowledge in the area of deep seabed mining, the training of personnel and the improvement of technology. Nevertheless, much more time is needed to acquire a thorough knowledge of the sites already allocated, which is essential in order to determine the time at which commercial exploitation will begin.

6. Cost of deep seabed mining

41. Capital and operating costs of deep seabed mining have sometimes been considered too high to allow early development of such deposits. However, when compared to a land-based mining operation, a polymetallic nodule project has to be separated into two distinct operations - one producing nickel, cobalt and copper, and the other producing manganese. If the expected revenue from the manganese operation is credited to the total production cost, the balance of the total production cost can be comparable to the cost of a land-based lateritic nickel operation. Consequently, deep seabed polymetallic nodule deposits can be ranked with the land-based deposits of manganese and lateritic nickel to be developed in the future, when access to new sources of these metals is needed.

/...

B. Analysis

1. Development of land-based and deep seabed resources

42. Investors have the option of deciding to invest in the development of land and/or deep seabed resources. Which they choose will depend on a variety of factors (such as discussed above) but will, to a great extent, depend on profitability. For the foreseeable future, the land-based resources appear adequate to meet supply at a cost of production such that deep seabed mining is of longer-term interest.

43. At the present time there is a high degree of uncertainty related to the balance of supply and demand and price. It will be some time before markets stabilize and mining companies are in a position to evaluate with any degree of confidence deep seabed deposits against new and marginal land-based sources. While it is extremely difficult to generalize, the Group is of the view that deep seabed mining will be considered as a serious investment option only sometime in the future.

44. One of the primary reasons that deep seabed sources remain a resource of the future is the cost and uncertainty associated with the large-scale testing of the deep seabed mining system and, to a lesser extent, the processing system. Many millions of dollars will be needed to conduct the feasibility studies at large scales and for time periods long enough to demonstrate the reliability of the systems. The same is generally not true of land-based sources since the technology is proven. There will have to be strong indications that a seabed deposit will have a significant cost advantage over a potential land deposit before the risk and investment could be justified.

45. On the other hand, it should be pointed out that there are some factors that could accelerate or favour consideration of deep seabed mining earlier than what would otherwise be the case. While the Group cannot predict such eventualities or suggest how they would affect the timing of seabed development, such factors as political and social instability or onerous regulatory regimes in countries or regions where important deposits are located could advance the timing. Another example would be the possibility that significant mineral resources could be located within environmentally protected areas where development would not be permitted.

2. Stages and time required

46. The issue of the possible date of the commencement of commercial production from the deep seabed can be viewed in terms of the stages that a deep seabed mining project has to go through before production occurs and the time required for each stage. In an earlier report, the Group of Technical Experts identified these stages and the time requirements (see LOS/PCN/SUR/R.5, figure 2).

47. Five stages were identified in that report, namely, (i) early period; (ii) research and development; (iii) feasibility study; (iv) construction; and (v) production. The report also identified two important decision points - the first, after the research and development stage, when a decision to proceed to the feasibility study stage would need to be taken; and the second, after the

/...

feasibility study stage, when a decision to start construction would need to be taken.

48. That report was prepared by the Group in August 1989 based on the information available at the time. At the present meeting, the Group recognized that in the light of the most recently available information regarding the status of activities related to deep seabed mining, there might be a need to review the estimations of time requirements for the stages and decision points provided in the earlier report.

49. All the initial exploration work has demonstrated that resources of nickel, copper, cobalt and manganese are present and can at some time be available for exploitation.

50. However, all the pioneer investors are at present in the stage of research and development, during which the technology of mining and processing is going to be tested, and additional exploration has to be conducted in order to identify the adequate deep seabed mining sites. Nevertheless, as the market environment does not appear attractive, there is a tendency to postpone the funding of tests and intensive exploration.

51. As soon as the metal market recovers, testing and exploration are expected to resume and lead to a decision to proceed to a feasibility study. The decision to commission such a study is unlikely to be taken in less than 5 to 10 years from now.

52. The feasibility study that must be financed by the industry would verify that with the existing technologies the cost of mining and processing is balanced by the revenues from the metals. Such a feasibility study would require two to three years to be completed and would lead to a decision to start the construction of the deep seabed mining system and processing plant.

53. This pre-production phase will require about four to seven years to be accomplished, during which a preliminary start-up of a deep seabed mining operation could be organized on a reduced-capacity basis in order to set up the mining system before it enters into full production.

54. This would mean that after testing and exploration has been recommenced there would be a period of at least 10 years before commercial deep seabed mining could begin.

III. CONCLUSIONS

55. In fulfilment of the mandate given to the Group of Technical Experts, this report of the Group presents a review of the state of deep seabed mining and provides an assessment of the time when commercial production may be expected to commence.

56. The review of the state of deep seabed mining is contained in paragraphs 7 to 20 above.

/...

57. As regards the time when commercial production may be expected to commence, the Group concludes as follows:

(a) Although the exact timing remains uncertain as a result of a variety of imponderable factors, commercial production from the deep seabed is likely at some time in the future because deep seabed resources constitute potential commercial prospects primarily on account of: (a) the vastness of resources; (b) the multi-metal characteristics of the ore; and (c) the absence of insurmountable technological obstacles in the mining or processing of these resources;

(b) It is, however, certain that commercial deep seabed mining will not take place during the remainder of the current decade (up to the year 2000);

(c) It is also unlikely that commercial deep seabed mining will take place during the following decade (2001-2010);

(d) An assessment of the time when commercial production from deep seabed mining may be expected to commence can be made with further precision when in the future large-scale feasibility studies and deep-sea tests for a sustained period are undertaken.

/...

**UNITED
NATIONS**

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.33
1 February 1994
ENGLISH
ORIGINAL: CHINESE

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY AND
FOR THE INTERNATIONAL TRIBUNAL FOR
THE LAW OF THE SEA
Twelfth session
Kingston, 7-11 February 1994

PERIODIC REPORT ON THE ACTIVITIES OF THE CHINA OCEAN MINERAL RESOURCES RESEARCH AND DEVELOPMENT ASSOCIATION (COMRA) IN THE PIONEER AREA

(Submitted by the delegation of China)

1. Pursuant to paragraph 5 of the understanding on the fulfilment of obligations by the registered pioneer investor, COMRA, and its certifying State, the People's Republic of China (LOS/PCN/L.102, annex), a report is hereby submitted on the activities conducted by COMRA during 1993, following the allocation by the Preparatory Commission of a 150,000 km^2 exclusive pioneer area in the north-eastern Pacific.

2. COMRA has been implementing a long-term programme which covers the following three major areas: (i) exploration; (ii) design and development of a pilot deep seabed mining system; and (iii) studies on ore-dressing and smelting technology. In addition, the plan specifically worked out for the implementation of the long-term programme includes research projects in basic geology relating to exploration and exploitation as well as comprehensive projects associated with overall research and development activities.

3. In accordance with the objectives of the long-term programme, COMRA organized and coordinated a number of Chinese agencies conducting deep seabed mining activities; these activities included the organization of design and demonstration, operational supervision and result check of associated projects specifically designed to ensure the timely implementation of the long-term programme. Different management methods were adopted for different projects. Exploration and basic geological studies carried out primarily by the institutions of the State Oceanic Administration and the Ministry of Geology and Mineral Resources, while studies on mining technology and on processing techniques are conducted mainly by the institutions of the Ministry of

/...

Metallurgical Industry and the China National Nonferrous Metals Industry Corporation. In accordance with the progress and needs of deep seabed mining activities, COMRA has established and organized the implementation of other relevant activities.

Exploration

4. The strategy for exploration is progressively to reduce the sampling grid intervals and to generate an accurate bathymetric chart of the pioneer area, with emphasis on evaluating the mining area and defining the possible mining site. To this end, the Chinese research vessel R/V Xiangyanghong 16 was assigned to undertake exploration of approximately 40,000 km^2 within the pioneer area. The ship set sail for the surveying area on 30 April 1993 but, unfortunately, was hit by a foreign cargo ship and sank at 5 a.m. on 2 May 1993, with three casualties. Following this tragedy, the department concerned took positive steps to restore capacity for ocean mineral resources exploration as quickly as possible. At present, exploration activities for 1994 in the pioneer area have been decided and cruise design has been completed. The R/V Xiangyanghong 9 and R/V Haiyang 4 have been assigned to undertake such exploration in the COMRA pioneer area.

Basic geology research projects

5. Basic geological studies were carried out along with exploration of the pioneer area. These included studies on: the regulation of distribution and the mechanism of formation of polymetallic nodules; the composition and geochemistry of polymetallic nodules and sediments; and exploration methods, resource evaluation and assessment of environmental impact. Relying heavily on exploration cruises at sea, 1993 research activities were carried out mainly on the basis of the sample data obtained on board the R/V Haiyang 4 in 1992. Some of the projects previously scheduled for 1993 were not completed because of the accident involving the R/V Xiangyanghong 16.

Design and development of a pilot deep seabed mining system

6. In accordance with the objectives set in both the long-term programme and periodic plans, and with a view to the future modelling experiment and subsequent pilot study of the mining system, institutions located in Beijing, Changsha and Ma'anshan which are affiliated with the Ministry of Metallurgical Industry and the China National Nonferrous Metals Industry Corporation drew broadly on all relevant literature and information for reference and have achieved results at various phases in the design and laboratory construction of three subsystems of the deep seabed mining system, namely, ore collection and lifting as well as their remote operational system.

Studies on ore-dressing and smelting techniques

7. Current efforts in the area of extractive metallurgy continue to focus on comparative studies of several technical processes of ore-dressing and smelting in the laboratory. In the meantime, studies have been conducted under the plan on the techniques for special ore-dressing of polymetallic nodules, on highly efficient flotation agents and on technological mineralogy. All the above-mentioned studies are being carried out mainly by the Changsha Research

Institute of Mining and Metallurgy of the Ministry of Metallurgical Industry, and by the Beijing Research Institute of Mining and Metallurgy of the China National Nonferrous Metals Industry Corporation.

Other projects

8. In order to coordinate China's deep seabed mining activities, COMRA has set up several other projects whose implementation is being organised by COMRA. These projects include: the development of norms and technical criteria; studies on the law and regulations; establishment of a database; market projections and commercial mining forecasting as well as studies on economic models and research on frontier marine science. Among these projects, the ocean mineral resource database has been established to a certain scale; results have been achieved at various stages in the preparation of standard samples, and 19 Chinese and foreign laboratories have been selected to jointly prepare standard references in order to improve the quality of standard samples and make them a more effective study tool; the ocean investigation norm is scheduled to undergo another test during exploration at sea before it is submitted to the metrological department for deliberation; studies on deep seabed mining legislation have been completed; basic data have been collected for market projections and commercial deep seabed mining forecasts; and studies on economic models are in progress, with results achieved at various phases.

Future programme

9. Exploration in the remainder of the pioneer area is to be given high priority in the near future, while the work of reducing sampling stations and grid intervals should continue with a view to determining the mining area. Once the first phase of exploration is completed, it should be possible to return part of the pioneer area to its international status. During actual exploration, efforts will be made to determine the parameters of polymetallic nodule properties and sediment mechanics characteristics, and to collect environmental and biological data in order to have a better understanding of the environment background of the pioneer area and with a view to developing a rational mining system design. Meanwhile, laboratory studies on mining and ore-dressing and smelting technology, comparisons among various plans are in progress. The possibility cannot be ruled out that some projects may be readjusted, optimized and reformulated on the basis of laboratory studies and a comparison of the various plans.

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.34
7 February 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Twelfth session
Kingston, 7-11 February 1994

PERIODIC REPORT ON THE ACTIVITIES OF INDIA IN THE PIONEER AREA

(Submitted by the delegation of India)

Pursuant to Resolution II of the Third United Nations Conference on the Law of the Sea, the Statement on the implementation of Resolution II of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex) and the Statement of Understanding on the implementation of Resolution II of 10 April 1987 (LOS/PCN/L.43/Rev.1), the Department of Ocean Development, Government of India, has been registered as a pioneer investor and an area of 150,000 sq km has been allocated in the Central Indian Ocean Basin with the exclusive right to carry out pioneer activities in the said area.

In accordance with the Understanding on the fulfilment of obligations by registered pioneer investors and their Certifying States (LOS/PCN/L.87 of 30 August 1990), the Department of Ocean Development, Government of India, has been presenting to the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea periodic reports* on the type and extent of activities undertaken by it.

The present report covers the details of the activities undertaken during 1993.

The pioneer activities relating to polymetallic nodules, as indicated in the previous reports, cover three distinct aspects: (i) exploration,

---

* LOS/PCN/BUR/R.11 dated 27 February 1992.

LOS/PCN/BUR/R.24 dated 25 March 1993.

/...

(ii) extraction of metals from nodules, and (iii) design and development of a test deep seabed mining system.

(i) Exploration

During the year 1993 exploration work in the pioneer area in the Central Indian Ocean was continued through the National Institute of Oceanography, Goa. One cruise of the research vessel ORV "Sagar Kanya" was devoted to this purpose. During this cruise detailed bathymetric data, with the aid of a multi-beam swath bathymetric system (hydrosweep system), were collected. An area of 25,000 sq km was surveyed and about 2,500 line km of magnetic and gravity data collected. Sediment and nodule samples were collected from six locations.

A comprehensive geostatistical evaluation of the resources of polymetallic nodules and their spatial distribution in the pioneer area was undertaken. Over 100 contour maps of different scale and contour intervals were generated. Extensive analysis of the existing data was undertaken. The entire database generated by the National Institute of Oceanography, GOA, was utilized for making more precise estimates of the resource potential. For purposes of evaluation and determination of minable blocks each block was assigned a rank in terms of relative superiority in terms of nodule potential and minability.

Engineers India Limited, New Delhi, continued to provide consultancy for exploration, planning and geostatistical resource evaluation.

(ii) Extractive metallurgy

The research and development work on extractive metallurgy for recovery of metal values from nodules was continued at the National Metallurgical Laboratory, Jamshedpur, the Regional Research Laboratory, Bhubaneswar and Hindustan Zinc Limited, Udaipur. Pilot plant campaigns at the National Metallurgical Laboratory, Jamshedpur, and the Regional Research Laboratory, Bhubaneswar, were continued. The data generated on leaching solvent extraction were analysed for obtaining material energy balance and for further improvement in the process technology. Tests were carried out at Hindustan Zinc Limited, Udaipur with different bleeding volumes to optimize the acid consumption and cobalt consumption in the pregnant liquor. A flow scheme was developed for low-cycle leaching.

(iii) Design and development of test seabed mining system

The work on design and development of a test mining system was continued at the Central Mechanical Engineering Research Institute, Durgapur. Under the first phase of the project a remotely operated collector unit and a bucket-in-pipe lifting system were designed, fabricated and tested in a shallow basin. A master-slave manipulator was also developed. The activities during 1993 related to generation of data for all the sub-systems, namely, collector unit, nodule lifting system, manipulator etc. The design parameters for a working model of the improved version of the collector unit capable of operating at a depth of 200 metres were firmed up. During the next phase studies on hydraulic and airlift systems, development of a remotely operated vehicle, electro-hydraulic components for underwater use, hydraulic nodule pick-up systems, water proofing

/...

techniques and development of instrumentation and control for underwater systems are envisaged.

Future programme

The activities planned for the year 1994 include:

- Continuation of deep seabed mapping using hydrosweep for microtopography;
- Semi-quantitative evaluation of the polymetallic nodules and associated parameters using back scatter information from hydrosweep;
- Collection of data on oceanography and environmental parameters;
- Collection of bulk samples of nodules for extractive metallurgy;
- Continuation of pilot plant campaigns for obtaining material and energy balance and filling critical gaps in the process routes for improved recovery of metals from nodules;
- Improvement in the design and development of a working model of a test mining system capable of operating at a 200-metre depth.

Training programme

Upon the recommendation of the Training Panel of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea, the General Committee designated in March 1993 Mr. Khalid Abdullah Kadi (Saudi Arabia) for the traineeship in mining geology and Mr. Kwama Odame Boamah (Ghana) for the traineeship in exploration geophysics under the training programme offered by India. Details of the traineeship are contained in document LOS/PCN/TP/1992/CRP.8 and Corr.1. Mr. Kadi arrived at Goa on 2 October and reported at the National Institute of Oceanography, Goa, on 4 October to receive training in mining geology. Mr. Boamah arrived on 5 October and reported on the same day to receive training in exploration geophysics. Mr. Kadi was on leave of absence from 13 to 21 December.

The trainees have already completed an orientation course and related practical phase at the National Institute of Oceanography in Goa. The next phase will cover specific subjects in detail and visits to national institutes in India - the National Metallurgical Laboratory, Jamshedpur, the Regional Research Laboratory, Bhubaneswar and Hindustan Zinc Limited, Udaipur.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.35
7 February 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
Twelfth session
Kingston, 7-11 February 1994

PERIODIC REPORT ON THE ACTIVITIES OF THE DEEP OCEAN RESOURCES DEVELOPMENT CO., LTD. (DORD) IN THE PIONEER AREA

(Submitted by the delegation of Japan)

During the period of the year 1993, DORD carried out exploration activities in the central region of the North-East Pacific, follow-up research work on land and training of future staff of the Authority.

The details of the activities are as follows:

1. Duration

(a) Cruising (depart from Honolulu and return to Honolulu, Hawaii): about 40 days;

(b) Laboratory works on land: about three weeks.

2. Area of exploration

The exploration area in 1993 is located within the pioneer area bounded by lines joining the following turning points, the coordinates of which are listed below:

/...

Turning points	Latitude (N)	Longitude (W)	Turning points	Latitude (N)	Longitude (W)
1	11° 00'	149° 15'	16	10° 22.5'	146° 32'
2	11° 00'	148° 30'	17	10° 07.5'	146° 32'
3	10° 48.75'	148° 30'	18	10° 07.5'	146 45'
4	10° 48.75'	147° 30'	19	9° 37.5'	146° 45'
5	11° 00'	147° 30'	20	9° 37.5'	146° 30'
6	11° 00'	147° 00'	21	9° 22.5'	146° 30'
7	10° 45'	147° 00'	22	9° 22.5'	146° 00'
8	10° 45'	146° 45'	23	8° 45'	146° 00'
9	11° 00'	146° 45'	24	8° 45'	147° 44.8'
10	11° 00'	146° 07.5'	25	10° 00'	147° 44.8'
11	11° 03.75'	146° 07.5'	26	10° 00'	148° 30'
12	11° 03.75'	145° 48.75'	27	10° 15'	148° 30'
13	10° 11.25'	145° 48.75'	28	10° 15'	149° 30'
14	10° 11.25'	146° 15'	29	10° 45'	149° 30'
15	10° 22.5'	146° 15'	30	10° 45'	149° 15'
			31	11° 00'	149° 15'

3. Name of the research vessel and the number of scientists and crew engaged in the activities on the vessel:

Research vessel: the Hakurei Maru No. 2

Scientists and crew: about 50 persons including 15 scientists.

4. Description of equipment and methods used:

(a) Positioning

- Satellite navigation

  Navy navigation satellite system (NNSS)

  Global positioning system (GPS)

/...

(b) Sea bottom topography and geological survey

- Acoustic sounding bathymetry topography

    Multi-beam echo sounder (MBES)

- Sea bottom sound pressure

    Multiple frequency exploration system (MFES)

- Sub-surface geological structure

    Sub-bottom profiler (SBP)

- Sampling

    Free-fall grab (FG)

- Analysis

    Pre-treatment equipment (drying, crushing)

    X-ray fluorescent analyser (XFA)

(c) Sea bottom observation

- Photograph

    Free-fall camera (FC)

(d) Data recording and processing

- On-line and off-line functions

    Data processing system (DPS)

(e) Laboratory work on land

- Chemical analysis of minor elements of manganese nodules

- Chemical analysis of marine sediments.

5. Results of past exploration activities

- Using the MBES, seafloor topographic maps were drawn on a 1/200,000 scale with contour intervals of 20 m by means of on-line and off-line functions.

- Abundance maps of manganese nodules with contour intervals of 2.5 kg/m^2 were drawn by means of MFES.

- On the basis of data obtained on manganese nodules using the FG, XFA and FC at each sampling point, the abundance map of manganese nodules, a grade map of nickel, copper, cobalt, manganese and iron as well as the metal quantity map were made.
- In order to determine characteristics of manganese nodules and chemical composition of marine sediments, detection of minor elements such as Pb, Zn, Y etc. was carried out as laboratory work on land.

6. Training programme

In accordance with the training programme annex of LOS/PCN/TP/1992/CRP.5, the following three trainees are presently undergoing training and will complete their training in February 1994:

- Traineeship of Mr. Pramuan Kohpina, Thailand, in the area of geology.
- Traineeship of Mr. Eu-Dug Hwang, Republic of Korea, in the area of geophysics.
- Traineeship of Mr. Mahmoud Mohammad-Taheri, Islamic Republic of Iran, in the area of electronic engineering.

/...

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.38
10 February 1994
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA
Twelfth session
Kingston, 7-11 February 1994

PROPOSAL BY THE RUSSIAN FEDERATION REGARDING THE DECISION BY THE GENERAL COMMITTEE ON THE AGENDA ITEM RELATING TO THE CONSIDERATION OF THE LETTERS FROM THE COORDINATOR OF THE GROUP OF REGISTERED PIONEER INVESTORS

The General Committee recommends that, bearing in mind document LOS/PCN/L.87, annex, the Preparatory Commission adopt a recommendation to the Authority not to charge registered pioneer investors the annual fixed fee until the commencement of commercial exploitation.

In view of the conclusion of the Group of Technical Experts that testing and exploration will be resumed in 5 to 10 years from now (LOS/PCN/BUR/R.32, para. 51), the General Committee decides that the period within which the registered pioneer investor shall submit to the Council of the Authority for approval a plan of work for exploration (resolution II, para. 8 (a)) is extended from 6 months to 10 years after the entry into force of the Convention.

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.39
24 February 1994
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED
AUTHORITY AND FOR THE
INTERNATIONAL TRIBUNAL FOR
THE LAW OF THE SEA

PERIODIC REPORT ON THE ACTIVITIES OF THE INTEROCEANMETAL JOINT ORGANIZATION (IOM) AND ITS CERTIFYING STATES IN THE PIONEER AREA FROM 1 JULY 1993 TO 31 DECEMBER 1993

(Submitted by the delegation of Poland)

1. In accordance with the Understanding on the fulfilment of obligations by the registered pioneer investor, the Interoceanmetal Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, the Republic of Poland and the Russian Federation (LOS/PCN/L.108, annex, of 20 August 1992), the periodic report on the activities of IOM for the period 1 July 1993 to 31 December 1993 is submitted herewith.

2. Activities for the reporting period focused on the following areas.

I. CORRELATION OF THE RESULTS OF REGIONAL GEOLOGICAL AND GEOPHYSICAL STUDIES OF THE SITE RESERVED FOR IOM

3. The most promising ore-bearing zone has been identified, covering an area of 97,700 sq km in which ore accumulations are grouped together, concentrated in ore blocks of four types of deposits offering the most favourable mining and geological conditions on the basis solely of geological and geomorphological factors.

4. It has been established that the hydrological and hydrobiological situation in the most productive section of the Area in terms of nodule concentration, which is narrowly oriented in the direction of the meridian between 9° N and 13° N, is extremely complex in nature. From an analysis of the available factual material, it has been established that multiple changes in the direction

/...

of flow occur, and it is quite clear that a hydrodynamic situation is created in which the same water masses from the extraction sites of some contractors will move into the extraction sites of other contractors and vice versa. This is of particular relevance in the border regions of the IOM, OMI and Kcon sites (the OMI and Kcon sites are directly contiguous to the IOM site).

5. Work is continuing on selection for further geological prospecting work and environmental studies, and of suitable sites for the preservation reference zone and the impact reference zones, taking into account the complex hydrological and hydrobiological conditions in the pioneer area.

6. The methodological and technological aspects of IOM's activity for the period of 1994-1995 have been defined; these relate to the need to conduct comprehensive geological and geophysical, hydrophysical, hydrochemical and hydrobiological studies of the reference geological and environmental section that cuts across the most productive ore blocks. On this basis, it is intended to select sites for further comprehensive micro-zone geological and environmental studies, on the scale 1:50,000, using bottom navigation.

II. CONDUCT OF MEASURES RELATING TO THE HOLDING OF A TRAINING PROGRAMME FOR THE PREPARATORY COMMISSION IN ACCORDANCE WITH DOCUMENT LOS/PCN/TP/1993/CRP.12/Rev.1 OF 26 MARCH 1993

7. Delegations of IOM experts have conducted the necessary consultations to agree on plans for the study disciplines and the conditions of their implementation. The plans have been drawn up in the light of the scientific and technical base and experience of training institutions in the countries participating in IOM in marine geological, geophysical and environmental studies and the development of technology for processing polymetallic nodules. The training plans developed for geophysics, marine ecology and metallurgical engineering will be finalized once information has been received from the Preparatory Commission's Training Panel on the trainees selected and the level of their professional qualifications.

III. RESEARCH INTO THE DEVELOPMENT OF TECHNOLOGIES FOR DEEP-SEA MINING AND THE METALLURGICAL PROCESSING OF POLYMETALLIC NODULES

8. Over the reporting period, research has continued into the development of technologies for deep-sea mining and the metallurgical processing of polymetallic nodules using the existing experience of the organizations in the countries participating in IOM in these fields, and also in cooperation with other pioneer investors. In particular, in accordance with the agreement reached, cooperation has begun in these fields between IOM and the China Ocean Mineral Resources Research and Development Association (COMRA), the pioneer investor from China. In the context of this cooperation, IOM has selected a commercial-quality sample of nodules meeting specified standards and weighing two tons, and prepared it for delivery to COMRA for the conduct of bench tests of the processes of hydraulic collection and hydraulic lifting of nodules,

/...

accompanied by assessment of possible losses of metals and the level of associated environmental pollution to be expected.

IV. PREPARATION OF A COMPUTERIZED DATABANK ON THE AREA RESERVED FOR THE AUTHORITY

9. Work continues on the preparation of a computerized databank on the area reserved for the Authority in accordance with paragraph 8 of document LOS/PCN/L.108, annex. The timing of the submission of the databank to the Preparatory Commission needs to be finalized.

/...

UNITED NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.39/Corr.1
23 May 1994
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA

PERIODIC REPORT ON THE ACTIVITIES OF THE INTEROCEANMETAL JOINT ORGANIZATION (IOM) AND ITS CERTIFYING STATES IN THE PIONEER AREA FROM 1 JULY 1993 TO 31 DECEMBER 1993

(Submitted by the delegation of Poland)

(Corrigendum)

Paragraph 1

The paragraph should read

1. In accordance with the Understanding on the fulfilment of obligations by the registered pioneer investor, the Interoceanmetal Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic*, the Republic of Poland and the Russian Federation (LOS/PCN/L.108, annex, of 20 August 1992), the periodic report on the activities of IOM for the period 1 July 1993 to 31 December 1993 is submitted herewith.

---

* On 25 November 1992, the Federal Assembly of the Czech and Slovak Federal Republic adopted Constitutional Law No. 542 which terminated the existence of the Czech and Slovak Federal Republic; the Law came into force on 31 December 1992. The legal successors to the Czech and Slovak Federal Republic are two sovereign States: the Czech Republic and Slovakia. The Czech Republic and Slovakia were both admitted to membership in the United Nations on 19 January 1993.

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.40
25 July 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
New York, 1-12 August 1994

REPORT OF THE GROUP OF TECHNICAL EXPERTS TO THE GENERAL COMMITTEE OF THE PREPARATORY COMMISSION FOR THE INTERNATIONAL SEABED AUTHORITY AND FOR THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA ON THE APPLICATION OF THE GOVERNMENT OF THE REPUBLIC OF KOREA FOR REGISTRATION AS A PIONEER INVESTOR UNDER RESOLUTION II OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA

CONTENTS

	Paragraph	Page
LETTER OF TRANSMITTAL		253
INTRODUCTION	1-3	255
I. Basic information regarding the application		256
II. Examination of the technical data and information to determine whether both parts of the application area are of equal estimated commercial value	4-38	258
III. Conclusions	39	266

Annexes

		Page
I. List of members of the Group of Technical Experts		268
II. List of coordinates of areas *		

---

* Confidential. Deposited with the Secretary-General.

/...

LETTER OF TRANSMITTAL

14 April 1994

Dear Mr. Chairman,

We, the members of the Group of the Technical Experts, appointed by the Chairman of the Preparatory Commission to examine the application of the Government of the Republic of Korea for registration as a pioneer investor in accordance with resolution II of the Third United Nations Conference on the Law of the Sea, have the honour to submit the attached report to the General Committee. The Group of Experts undertook an examination of the application in accordance with its mandate and the attached report, which was adopted unanimously, contains the result of this examination.

The meeting was held at United Nations Headquarters in New York. The Group met between 11 and 14 April 1994 during which period the Group held eight meetings.

We regret that two members of the Group, Dr. Knut S. Heier (Norway) and Mr. David W. Pasho (Canada), were unable to attend this meeting.

The Group wishes to express its appreciation for the cooperation of the representatives of the applicant, the Government of the Republic of Korea.

The Group would like to thank you and the Preparatory Commission for the opportunity to assist in the discharge of the Commission's mandate. The Group also wishes to thank Mr. Jean-Pierre Lévy, Director of the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs, and his staff for their assistance throughout the meetings.

Yours sincerely,

Signed in New York on 14 April 1994:

Samuel Sona BETAH
(Cameroon)

Alfredo José DA SILVA NETTO
(Brazil)

Ivan F. GLOUMOV
(Russian Federation)

Mr. José Luis Jesus
Chairman of the Preparatory Commission
for the International Seabed Authority
and for the International Tribunal for the
Law of the Sea
New York, New York

/...

Knut S. HEIER
(Norway) - absent

John KAGASI
(Kenya)

Hicuunga H.E. KAMBAILA
(Zambia)

Jean-Pierre LENOBLE
(France)

LI Yuwei
(China)

Alfonso LOPEZ-REINA
(Colombia)

Sulaiman Zuhdi PANE
(Indonesia)

David W. PASHO
(Canada) - absent

Luis G. PREVAL PAEZ
(Cuba)

Toshio SAKASEGAWA
(Japan)

T.R.P. SINGH
(India)

/...

INTRODUCTION

1. The Group of Technical Experts was established in accordance with the decision taken by the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea which is embodied in paragraph 6 of the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex). The Group was mandated to determine whether applications for registration as pioneer investors are in conformity with resolution II of the Third United Nations Conference on the Law of the Sea, in particular with the principle of equal estimated commercial value, subject to the guidelines and procedures set forth in the statement of understanding of 5 September 1986 and to submit a report on each application to the General Committee. The Group noted that in case of there being different opinions among its members, such opinions shall be included in the report (LOS/PCN/L.41/Rev.1, annex, para. 4).

2. In accordance with the relevant decision of the Preparatory Commission, the application of the Republic of Korea was examined to ensure whether it was in conformity with resolution II taking into account that the Republic of Korea, "like other applicants, if it so wishes, will identify in its application area, an area totalling 52,300 square kilometres for incorporation in the area of up to 150,000 square kilometres to be allocated to it as a pioneer area. The provisions on relinquishment in resolution II, paragraph 1 (e), shall apply to the allocated area." 1/

3. The Group of Technical Experts held its initial meeting on the morning of 11 April 1994. The Director of the Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, Mr. Jean-Pierre Lévy, briefed the Group on its mandate and outlined the specific procedures that would be in effect to ensure the confidentiality of data and information contained in the application of the Republic of Korea. The application of the Republic of Korea was then opened in the presence of the representative of the applicant. Mr. Joon Ho Han, Head of the Korean delegation, introduced the application, which the Group proceeded to examine immediately. The Group met each day in morning and afternoon sessions from 11 to 14 April 1994.

1/ Paragraph 13 (3) of the statement on the implementation of resolution II, contained in the annex to document LOS/PCN/L.41/Rev.1.

I. BASIC INFORMATION REGARDING THE APPLICATION

A. Identification of the applicant

1. Name of State(s) or certifying State(s):

Republic of Korea

2. Date of signature of the Convention by the certifying State or States:
14 March 1983

3. Applicant:

a. Name Ministry of Trade, Industry and Energy,
Government of the Republic of Korea

b. Mailing address 1 Jungang-dong, Kwachon-shi
Kyonggi-do, 427-760
Republic of Korea

c. Telephone number (82) 2-504-6000
Facsimile number (82) 2-503-9496

d. Name of designated representative or designated authority Ministry of Trade, Industry and Energy

e. Mailing address 1 Jungang-dong, Kwachon-shi
Kyonggi-do, 427-760
Republic of Korea

f. Telex address

4. Status of the applicant:

State ☒

State enterprise ☐

Natural or juridical person ☐

/...

5. Certificate of registration as a juridical person (if applicable)

Submitted: Yes ☐ No ☐

Not applicable ☒

6. Date of receipt of application: 14 January 1994

B. Data submitted by the applicant

1. Certification of required levels of expenditures

Submitted: Yes ☒ No ☐

2. Assurances of absence or resolution of conflicts concerning overlapping claims

Submitted: Yes ☒ No ☐

3. Coordinates of the application area

Submitted: Yes ☒ No ☐

4. Data with respect to both parts of the application area used to estimate commercial value of each part

Submitted: Yes ☒ No ☐

5. Assurances that the application area is located beyond the limits of national jurisdiction of any State

Submitted: Yes ☒ No ☐

6. Assurances of compliance with the provisions of resolution II and the statement of understanding of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex)

Submitted: Yes ☒ No ☐

C. Payment of fee:

The applicant agrees to make the payment of US$ 250,000 as the fee for registration as a pioneer investor and for the allocation of a pioneer area as soon as the applicant is advised by the Preparatory Commission.

/...

II. EXAMINATION OF THE TECHNICAL DATA AND INFORMATION TO DETERMINE WHETHER BOTH PARTS OF THE APPLICATION AREA ARE OF EQUAL ESTIMATED COMMERCIAL VALUE

A. Proposal

4. The presentation identified an application area of 300,000 square kilometres that was subdivided into 11 sectors, 8 of which fell in the southern region and the remaining 3 sectors in the northern region of the application area. The applicant further identified two groups of sectors, namely group G1 and group G2, each of 97,700 square kilometres and of equal estimated commercial value. The applicant identified a sector B2 covering an area of 52,300 square kilometres for incorporation into the pioneer area to be allocated to the applicant in accordance with paragraph 13 (3) of document LOS/PCN/L.41/Rev.1, annex, of 5 September 1986. The applicant also identified a sector D2 totalling 52,300 square kilometres with approximately equal estimated commercial value as the sector B2. The applicant proposed that the sector B2 together with one of the two groups of sectors G1 or G2 totalling 150,000 square kilometres be allocated to the applicant as the pioneer area and that the remaining group of sectors (G1 or G2) together with the sector D2 totalling 150,000 square kilometres be retained as the reserved area of the Authority. Thus, the applicant provided two options: Combination 1 (with G1 + D2 as one area and G2 + B2 as another area); and Combination 2 (with G1 + B2 as one area and G2 + D2 as another area).

5. The proposal of the applicant, as presented, allows for a meaningful choice by the General Committee between an area to be reserved for the Authority and an area to be allocated to the applicant. Accordingly, the applicant provided a proposal that met the requirements.

B. Data submitted

6. The total application area is divided into 11 sectors, as detailed below:

Region	"G" designation	Sector	Area in square kilometres
North	G2	N1	20 134
	G1	N2	37 204
	G2	N3	17 070
South	G1	A1	18 541
	G2	A2	18 650
	G2	B1	23 464
	–	B2	52 300
	G2	C1	18 382
	G1	C2	17 733
	G1	D1	24 222
	–	D2	52 300

/...

The group of sectors G1 consists of sectors A1, C2, D1 and N2 and the group G2 consists of sectors A2, B1, C1, N1 and N3. The disposition of sectors in the application area and their grouping is shown in Figure 1.

7. The following technical documents were included in the application by the Republic of Korea:

(a) Maps: [2]

- (i) Overview map of application area;
- (ii) Disposition of sectors in the application area;
- (iii) Overview of the sectors and their grouping in the two areas;
- (iv) a. Bathymetric maps of the application area with 50 metre contour intervals (3 maps);

  b. Bathymetric maps of the application area with 100 metre contour intervals (3 maps);
- (v) Charts showing track lines of bathymetric surveys (3 maps);
- (vi) Geomorphological maps of the application area (3 maps);
- (vii) Maps showing station locations, nodule abundance and metal contents of manganese and iron (3 maps);
- (viii) Maps showing metal contents of nickel, copper and cobalt (3 maps).

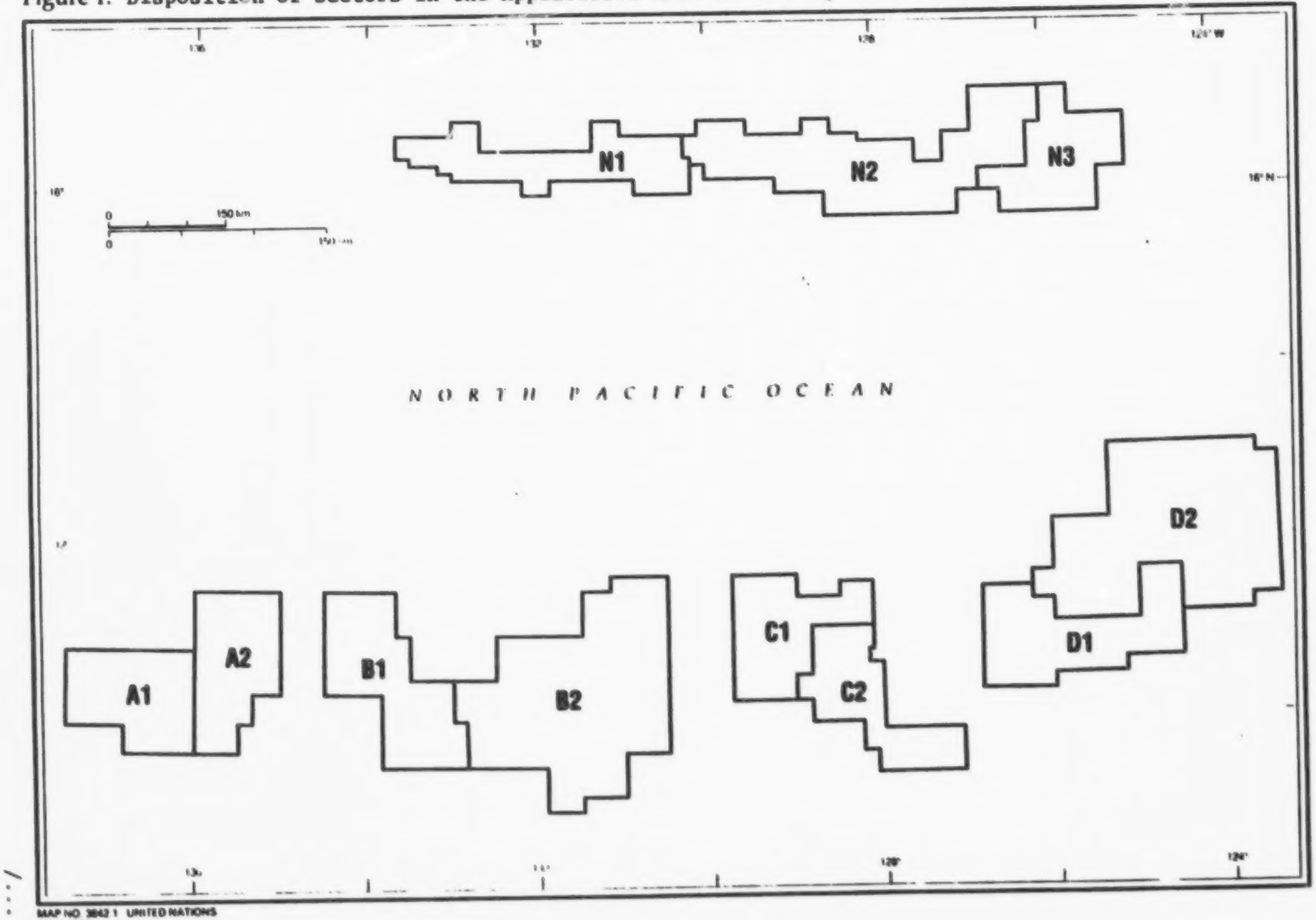
(b) Tables:

Table 1:	Coordinates of turning points of various sectors in the application area (6 pages);
Table 2:	Coordinates, metal contents and abundance of polymetallic nodules, and water depths of the survey stations in the application area (14 pages);
Table 3:	Statistics of the amount of polymetallic nodule resources in the application area (2 pages);
Table 4:	Statistics of nodules and metal resources in the two groups of sectors G1 and G2 (1 page combined with table 5);
Table 5:	Statistics of nodules and metal resources in two possible combinations of groups and sectors;
Table 6:	Lists of survey equipment and analytical equipment (2 pages).

---

[2] All maps, except those mentioned in paragraphs 7 (a) (i), (ii) and (iii), are of the scale 1:1,000,000.

Figure 1. Disposition of Sectors in the Application Area of the Republic of Korea



MAP NO. 3842.1 UNITED NATIONS
JULY 1994

/...

8. The applicant volunteered to provide additional processed information, which the Group greatly appreciated. The following additional information/data were furnished at the request of the Group by the applicant:

(a) Frequency distribution curves for abundance and metal accumulation for individual sectors and their combinations (80 pages);

(b) Standard deviation values for abundance and tonnages of nodules and metals for individual sectors and their combinations (2 pages).

9. All technical data submitted in the application have been gathered using standard and recognized methods.

10. The Group records its appreciation for the quality of presentation of the application in terms of format, style, clarity and extent of information. The Group noted further that this was the first application in which the bathymetry of the application area was based largely on multi-beam swath mapping system. This is viewed by the Group to represent an evolutionary trend in exploration technology.

C. Methodology

1. General

11. The Group used a number of indicators that have proved useful in assessing equal estimated commercial value. As with previous applications, it was recognized that any approach should be based on the fact that the data reflect the prospecting or exploration stage and that they should be based on a relative comparison of the two areas and not on an assessment of absolute commercial potential or the economic feasibility of commercial operations in the areas.

12. The most important factors were considered to be the metal content, nodule abundance and bathymetry. Because the complex relationship between these factors makes it impossible to make a comparative assessment on the basis of one single composite indicator, several indicators were used in order to ensure comprehensive consideration of the variety of factors that might now, or in the foreseeable future, have a major effect on the relative commercial values of the two areas.

13. As with previous applications, the Group, comprising experts in various disciplines, adopted a set of criteria and an approach that centred essentially on technical aspects.

14. Taking into account the relevant provisions contained in resolution II regarding mapping, sampling, abundance of nodules and their metal content, the Group used its established procedure for a thorough examination of each and every factor mentioned above.

15. In order to accomplish this task, the Group divided itself into five teams as follows: the first carried out a comprehensive study of nickel; the second, manganese and copper; the third, cobalt; the fourth, abundance and

tonnage of nodules; and the fifth, an examination of the seabed topography.

2. Basis of evaluation

16. The Group had the advantage of using the extensive processed information furnished by the applicant. These included:

(a) Estimated abundance and quantities of nodules and metals in individual sectors and their combinations;

(b) Frequency distribution (histograms as well as cumulative curves) for estimated abundance and metal accumulation for individual sectors and their combinations; and

(c) Standard deviations of estimated abundance as well as quantities of nodules and metals in individual sectors and their combinations.

Rather than developing independent information on all indicators, the Group decided to use the extensive processed information furnished by the applicant after subjecting them to necessary validation and cross-checking.

3. Metal content

17. The Group evaluated the relative amounts of nickel, copper, cobalt and manganese metal contained in the nodules from each area. The basic information used to make this comparison was developed on the basis of both the metal content and the metal accumulation, taken as the per cent metal times the nodule abundance at each of some 260 stations. The metal content values plotted on charts were used to evaluate the relative distribution and trends in various areas. This procedure was carried out for each individual metal and used to determine whether one or the other area contained larger areas of higher-grade nodules.

18. An additional analysis was made from the cumulative frequency distribution of the metal content and accumulation in various combinations of sectors. This was done in order to assess possible differences that might not be reflected in the data on the mean value of metals in the areas. Extensive use was made of the frequency distribution curves of metal accumulation provided by the applicant.

4. Abundance

19. The data on abundance given for each station were used to verify the average abundance and the tonnage of nodules as well as their range of variation at 95 per cent confidence level in all the individual sectors. The cumulative frequency distribution was studied for each sector as well as their combinations to assess possible differences.

5. Bathymetry and geomorphology

20. The examination of geomorphological and tectonic features of the application area was carried out by checking and comparing all topographical

/...

and geomorphological maps and information provided by the applicant. The nature of the data available at this stage of prospecting and on a scale of 1:1,000,000 allows only a regional comparison of the areas. The regional comparison was carried out on the basis of data and information on the water depth, geomorphology and structural alignment. The evaluation also focused on geomorphological features such as slope angles, general geomorphology of the sea bottom and the frequency and distribution of recognizable geomorphological features. The relief and bathymetric features that might affect exploration and exploitation were also considered. The process recognizes the relative nature of the comparisons since the data and information are taken from the bathymetric charts of the applicant which were computed by a combination of multi-beam swath and conventional single-channel echo sounders.

D. Results of the evaluation

1. Adequacy of data

21. The Group reviewed the type, frequency and spatial distribution of the data and concluded that they were adequate for developing information that could be used to assess two areas of equal estimated commercial value. The data are also adequate to show that the areas have similar technical characteristics which make them worthy of further exploration in order to delineate possible mine sites.

22. The Group agreed that the hydrological and meteorological conditions of the sectors in the northern region may be considered similar, primarily on account of their proximity. The same applies to the sectors in the southern region.

2. Metal content

23. The Group carried out an evaluation of nickel, copper, cobalt and manganese in the individual sectors and their combinations.

24. Nickel. The data on nickel distribution suggested that the northern region in general was poorer than the southern region. The data on nickel tonnage and their standard deviations and the frequency distribution of nickel accumulation were used to evaluate various sectors and their combinations. In this respect, sectors D2 and B2 are determined to be comparable particularly in high-value ranges. The groups of sectors G1 and G2 could be considered similar with respect to nickel.

25. Copper. The analysis of the data on copper led to the same conclusions as those reached for nickel.

26. Manganese. The analysis of the data on manganese led to the conclusion that sectors D2 and B2 are similar, particularly when considering the higher ranges of manganese values. In the northern region, the sector N2 shows a manganese distribution similar to that found in the combination of sectors N1 and N3. In the southern region, the manganese frequency distribution was also found to be similar between the group of sectors A1, C2 and D1 and the group of sectors A2, B1 and C1. Consequently it was found that the group of sectors

/...

G1 was similar, as far as manganese content was concerned, to the group of sectors G2.

27. Cobalt. The cobalt accumulation per unit surface area and the distribution of cobalt accumulation values are higher in the northern part as compared with the southern part. The statistical distribution of cobalt values suggests that the sectors B2 and D2 are similar. Further, the group of sectors G1 is similar in cobalt value to the group of sectors G2.

3. Abundance and tonnage

28. The frequency distribution of abundance and tonnage of nodules in the individual sectors was studied. The comparison of frequency distribution of abundance and calculated tonnage of nodules in sectors B2 and D2 led to the conclusion that they were similar as far as nodule abundance was concerned. Likewise, with respect to the sectors in the northern region, sector N1 and sectors N2 + N3 were found similar in both distribution of abundance and tonnage of nodules. When considering the group of sectors defined as G1 and the group G2, they were found to be similar as far as abundance frequency distribution and tonnage of nodules were concerned.

4. Bathymetry and geomorphology

29. The data available at the current stage of prospecting were rather comprehensive. Modern technology was used in the investigation of the seabed topography, e.g., the extensive use of a multi-beam swath echo sounder (Seabeam 2000) and it was examined from both digital data and analog profiles of sub-bottom profiler and precision depth echo sounder. Relief, water depth, shape of hills and basins as well as distribution of hills and seamounts were examined to characterize sea-bottom morphology.

30. The application area lies between the Clarion/Clipperton Fracture Zone in the north-east Pacific Ocean. It is characterized by the NEE-SWW trending major faults between which are numerous second-order faults and fractures whose trends are in the north-south direction. These second-order structures seem to control the shape and the alignment of the abyssal hills and basins in the area. They are also associated with volcanic eruptions which are responsible for the numerous distribution of seamounts aligned in the east-west direction with some showing irregular distribution.

31. There exists a basaltic basement which underlies much of the northern and southern region of the application area being exposed in the North-East Pacific basin and on the slopes of the East Pacific Rise. This has been a result of fissure eruptions from the second-order faults. The general relief resulting from the basaltic basement is the presence of large plains and plateaux littered with numerous small seamounts in both southern and northern regions. In between these are compensation basins in which sediments are irregularly distributed whose thickness decreases near the base of the conical volcanoes.

/...

32. The bathymetry and geomorphology analysis of the application area revealed two distinct regions: one in the north characterized by a succession of valleys and abyssal seamounts which are longitudinally oriented and cross-cut by volcanic structures. These are characterized by deep valleys whose reliefs are of volcanic origin in the east and volcano-sedimentary in the west. The region in the south is characterized by good abyssal plains with wide valleys sub-longitudinally oriented and covered by a thick layer of sediment. In both regions the highest part is located at the east and slopes gently towards sector B2, whose slope does not exceed 6°.

33. The bathymetry of sector B2 is characterized by greater water depths, of between 4,800 and 5,200 metres. This sector has typically low relief consisting of plains with wide-bottom valleys and covered by thick sediments. Sticking out of these plains are a number of volcanic cones whose slopes are covered by thin layers of sediments. In comparison, sector D2 lies between 4,400 and 4,800 metres below sea level. It is in fact shallower than sector B2 and is covered by relatively thinner volcanic sediments.

34. On examination of the geological, topographical and geomorphological characteristics of sectors B2 and D2, the Group concluded that sector B2 presents marginally smoother topography that could be favourable for future mining activities; but sector D2 presents shallower depths that would reduce the cost of lifting the nodules.

35. The Group also studied groups of sectors G1 and G2 and concluded that both are comparable, although the group of sectors G1 presents characteristics marginally better for future mining activity.

36. The division of the northern region into 3 sectors and the southern region into 8 sectors and the grouping of the sectors into G1 and G2 and the further combination of G2 and B2 on the one hand and of G1 and D2 on the other produced similar bathymetric and morphological characteristics with a good balance.

E. Selection of areas

37. In the light of the above evaluations, the Group of Technical Experts considered the selection of one of the two groups of sectors, G1 or G2, to be incorporated into the area to be allocated to the applicant, and the remaining group into the area to be reserved for the Authority. It was concluded that the aggregation of the group of sectors G1 plus sector D2 and the aggregation of the group of sectors G2 plus sector B2 in Combination 1, each totalling 150,000 square kilometres, were of equal commercial value. Similarly, the Group concluded that the aggregation of the group of sectors G2 plus sector D2 and the aggregation of the group of sectors G1 plus sector B2 in Combination 2, each totalling 150,000 square kilometres, were also of equal estimated commercial value. However, based on the spatial configuration of the various sectors and their contiguity, it was concluded that Combination 1 represented a preferred option. Accordingly, the aggregation of the group of sectors G1 plus sector D2 is re-designated as Area A and the aggregation of the group of sectors G2 plus sector B2 is re-designated as Area B.

/...

38. The coordinates of Areas A and B have been determined by the Group of Technical Experts and are contained in a sealed envelope deposited with the Secretary-General of the United Nations. Figure 2 shows the proposed disposition of Areas A and B.

III. CONCLUSIONS

39. The following conclusions were reached unanimously by the Group:

(a) Having examined the particulars submitted by the applicant, which are summarized in part I of the present report, the Group has concluded that the application has been submitted in accordance with resolution II and the understanding contained in document LOS/PCN/L.41/Rev.1, annex;

(b) Having evaluated the technical data and information submitted by the applicant as referred to in part II of the present report, the Group determined that Areas A and B are of equal estimated commercial value;

(c) As regards the designation of the reserved area and the allocation of the pioneer area, the Group agreed to recommend for the consideration of the General Committee:

(i) That Area A should be designated as the area to be reserved for the Authority;

(ii) That Area B, which includes an area of 52,300 square kilometres identified by the applicant, should be designated as the pioneer area to be allocated to the applicant.

/...

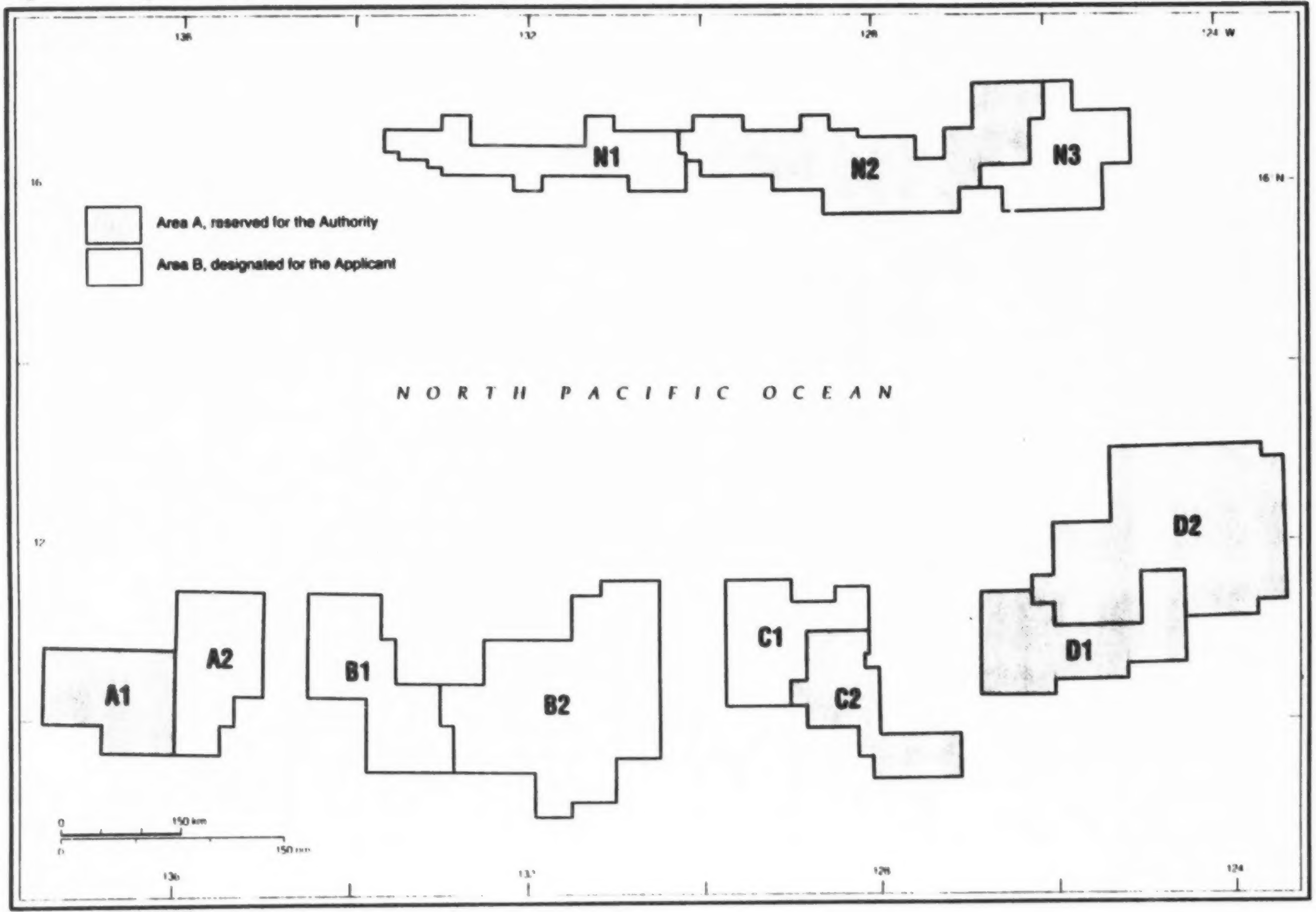


Figure 2. Proposed disposition of Areas A and B in the Application of the Republic of Korea

136
132
128
124 W
16 N
16
12
N1
N2
N3
Area A, reserved for the Authority
Area B, designated for the Applicant
N O R T H P A C I F I C O C E A N
A1
A2
B1
B2
C1
C2
D1
D2
0
150 km
0
150 nm
136
132
128
124

MAP NO. 3842.2 UNITED NATIONS
JULY 1994

/...

Annex I

LIST OF MEMBERS OF THE GROUP OF TECHNICAL EXPERTS

1. Mr. Samuel Sona Betah
Director of Geology
Ministry of Mines, Water and Power
Yaoundé, Cameroon

2. Dr. Alfredo Jose Da Silva Netto
Rua Marques de Abrantes, 115/1102
Rio de Janeiro, RJ
CEP 22230, Brazil

3. Professor Ivan F. Gloumov
Chief of Department on the Continental Shelf and Sea/Ocean Mineral Resources
Committee of the Russian Federation on Geology and Use of Mineral Resources
4/6 Bolshaya Gruzinskaya Street
Moscow, 123242 Russian Federation

4. Dr. Knut S. Heier
Director
Geological Survey of Norway
Leiv Erikssons Vei 39
P.O. Box 3006 Lade
N-7002 Trondheim, Norway

5. Mr. Hicuunga H.E. Kambaila
Deputy Permanent Secretary
Ministry of Mines and Minerals Development
P.O. Box 31969
Lusaka, Zambia

6. Mr. John Kagasi
Senior Geologist
Mines and Geological Department
Ministry of Environment and Natural Resources
Machakos Road
P.O. Box 30009
Nairobi, Kenya

7. M. Jean-Pierre Lenoble
Institut français de recherche pour l'exploitation de la mer (IFREMER)
155 rue Jean-Jacques Rousseau
92138 Issy les Moulineaux CEDEX
France

/...

8. Dr. Li Yuwei
Director
Chinese Institute of Geology and Mineral Resources Information
Ministry of Geology and Mineral Resources
277 Fuwaibeijie
Beijing, 100037, China

9. Dr. Alfonso Lopez-Reina
Asesor Geologíca
Eje Cafetero de Colombia
Calle 76, No. 8-56
Apto. 401
Bogotá, Colombia

10. Mr. S. Zuhdi Pane
Vice President/Head of Foreign Contractors Management Body
Pertamina Bppka
Jln. Merdeka Timur No. 1A
Jakarta 10010, Indonesia

11. Eng. Luis G. Preval Paez
General Advisor
Ministry of Basic Industry
Avenida Salvador Allende 666
Havana 3, Cuba

12. Dr. David W. Pasho
Director, Resource Management
Mineral Policy Sector
Department of Energy, Mines and Resources
460 O'Connor Street, 11th floor
Ottawa, Canada

13. Mr. Toshio Sakasegawa
Director, Personnel Division
General Affairs Department
Metal Mining Agency of Japan
1-24-14, Toranomon, Minatoku
Tokyo, Japan

14. Dr. T.R.P. Singh
Deputy General Manager
Engineers India Ltd.
R.K. Puram
New Delhi 110066, India

/...

UNITED
NATIONS

LOS

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.41
1 August 1994
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
New York, 1-12 August 1994

DRAFT DECISION OF THE GENERAL COMMITTEE

Proposal by the Russian Federation

The General Committee, in accordance with paragraph 40 (b) of document LOS/PCN/L.87 and taking into account the conclusion of the Group of Technical Experts that testing and exploration will resume in 5 to 10 years (LOS/PCN/BUR/R.32, para. 51), decides that the period during which a registered pioneer investor must submit for approval by the Council of the Authority a plan of work for exploration, shall be increased to 10 years following the entry into force of the Convention.

/...

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.42
1 August 1994
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA

DRAFT DECISION OF THE GENERAL COMMITTEE

Proposal by the Russian Federation

The General Committee,

Bearing in mind that in accordance with paragraphs 15 and 19 (e) of document LOS/PCN/L.41/Rev.1, annex, the regime granted to potential applicants shall be similar to the regime granted to the first group of applicants, who became the registered pioneer investors,

Bearing in mind further that on the basis of paragraph 40 (a) of document LOS/PCN/L.87 concerning the Understanding on the Fulfilment of Obligations by the Registered Pioneer Investors and their Certifying States, if potential applicants are granted a regime more favourable than the regime granted to the first group of applicants, the obligations of the latter are to be adjusted in such ways as may be necessary,

Taking into account the fact that a number of registered pioneer investors have been granted a more favourable regime than the regime granted to the first group of applicants,

Stressing that implementation of the principles of equality of treatment and non-discrimination in respect of all registered pioneer investors is of basic importance,

1. Decides to consider that the obligations of the registered pioneer investors set forth in paragraphs 2, 7 and 8 of the Understanding on the Fulfilment of Obligations by the Registered Pioneer Investors and their Certifying States (LOS/PCN/L.87, annex), have been entirely fulfilled by them;

/...

2. *Establishes* that with account taken of paragraph 1 above and in accordance with paragraph 10 of document LOS/PCN/L.87, annex, the obligations of the three registered pioneer investors, France, Japan and the Russian Federation, under resolution II, paragraph 7 (b), to pay US$ 1 million per annum are waived as of the date of their registration.

UNITED NATIONS
CONVENTION ON THE
LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.43
2 August 1994
ENGLISH
ORIGINAL: RUSSIAN

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
New York, 1-12 August 1994

PERIODIC REPORT ON THE ACTIVITIES OF YUZHMORGEOLOGIYA IN THE PIONEER AREA OVER THE PERIOD 1 JANUARY 1993 TO 1 AUGUST 1994

(Submitted by the delegation of the Russian Federation)

1. In accordance with paragraph 5 of the understanding of 30 August 1990 on the fulfilment of obligations by the registered pioneer investors and their certifying States (LOS/PCN/L.87, annex), a report is hereby submitted on the activities conducted by Yuzhmorgeologiya from 1 January 1993 to 1 August 1994 in the 75,000 sq km pioneer area in the north Pacific allocated to the Russian Federation by the Preparatory Commission.

2. In view of the unpropitious economic conditions for the commencement of industrial mining in the near future and of certain difficulties in the economic development of the Russian Federation, a limited amount of work was carried out by Yuzhmorgeologiya during this period.

3. Correlation of the results of geological and geophysical studies in the pioneer area was undertaken using a procedure developed by the Russian Federation, France and Japan during the conduct of similar work in the Authority's area.

4. The environmental experiment in full-scale simulation of the ecological consequences of industrial mining of ferromanganese nodules (BIE-2, BIE-13) was continued jointly with scientists from NOAA (United States of America).

5. To study the geological structure of deep-water ocean regions, three types of deep-water equipment operating on the basis of utilization of acoustic information were developed and tested:

/...

- A side-scan surface sonar with a parametric profilograph (Okean-M) for regional study, over a 25-km wide swath during a single run by the vessel, of the morphology of the ocean floor and the density of ferromanganese nodule deposits;

- A bottom side-scan sonar with a parametric profilograph (MAK-2m) for detailed study over a 1.5-km wide swath, during a single run by the vessel, of the morphology of the ocean floor and the density of ferromanganese deposits;

- A deep water (6,000-metre) remote-controlled photographic and television system (RTM-6,000) for detailed study of the density of ferromanganese nodule deposits and detection of polymetallic sulphides and cobalt-manganese crusts.

6. These advanced deep-water technologies are in the public domain and may be made available to any users on a commercial basis.

7. A design was also developed for the construction of a multi-purpose vessel for mining ocean mineral resources - ferromanganese nodules, polymetallic sulphides, cobalt-manganese crusts and posphorites.

8. In addition, Yuzhmorgeologiya made a substantial contribution to the organization and successful conduct of training for two trainees (one of the trainees selected for training by the Training Panel, Mr. Munyao of Kenya, did not attend) as provided for in the above-mentioned understanding of 30 August 1990.

I. THE TECHNOLOGY PACKAGES FOR MINERAL RESOURCE PROSPECTING IN DEEP SEABED AREAS

9. The "Okean" surface acoustic package is designed to produce an acoustic image of the surface of the ocean floor and an acoustic section of the upper layer of bottom sediments over a swath up to 25 km wide, in the course of a single run by the vessel. The acoustic image depicts sufficiently clearly the major areas of distribution of ferromanganese nodules, cobalt-manganese crusts or polymetallic sulphide structures.

10. The information obtained in this way makes possible the subsequent optimum identification of the most promising areas of distribution of mineral resources on the ocean floor and the organization of more detailed studies of these areas using the bottom acoustic and photographic/television systems.

11. Structurally, the "Okean" package consists of on-board equipment which records the information and a towed unit (a "fish") on which the acoustic transmitting and receiving systems are installed.

12. The MAK-1m bottom acoustic package is designed to produce an acoustic image of the surface of the ocean floor and an acoustic section of the upper layer of the bottom sediments as the vessel moves along.

/...

13. Structurally, the package consists of on-board receiving/recording and processing equipment, a towed deep-water unit on which the transmitting and receiving antennae for the two-frequency side-scan sonar and the profilograph are installed, and a 10-km long wire cable through which is transmitted, over a special communications line, acoustic information describing the bottom morphology, the density of the ferromanganese nodule deposit and the geological structure of the bottom sediments.

14. There is provision for two operating regimes:

- Detailed high-resolution surveying at an operating frequency of 100 kilohertz;

- Longer-range surveying by acoustic scanning of the ocean floor at an operating frequency of 30 kilohertz.

15. The RTM-6000 remote-controlled photographic and television system is designed for detailed study of the areas of distribution of ferromanganese nodules, cobalt-manganese crusts and polymetallic sulphides, and also for other deep-water prospecting studies.

16. It is equipped, in modular configuration, with a colour photographic/television system, and also with acoustic equipment and mechanical arms.

17. Thus the RTM remote-controlled package is similar in operating functions to a manned craft, but with considerable advantages over it in terms of manoeuvrability, ability to enter confined spaces and the possibility of working for an extended period at no risk to the personnel. It is extremely effective when used in detailed studies of ocean mineral resources, and particularly in environmental experiments.

II. ENVIRONMENTAL STUDIES (THE BIE INTERNATIONAL EXPERIMENT)

18. On the basis of the Deep Ocean Mining Environmental Study (DOMES) programme and the recommendations of a 1984 report by the United States National Research Council, it was determined that one of the areas requiring further study is investigation of the disturbance of the benthic natural environment caused by deep-water mining of minerals. The main reasons for concern relate to the considerable negative impact of the collection unit on the seabed environment. In particular, this must include destruction of benthic organisms in the mining area and the deposit of sediments on the benthos, as well as reduction of the food base in the vicinity of the area (caused by redistribution of the disturbed sediments).

19. NOAA's Ocean Minerals and Energy Division in the United States of America and the Geology Committee in the Russian Federation are authorized to issue licences and permits for deep-water mining of minerals, and are responsible for assessing the potential negative impact on the environment. These organizations are working with their partners in other countries to encourage joint efforts in the study of these environmental issues.

/...

20. Thanks to a considerable extent to the efforts made by Dr. Erdogan Özturgut and Dr. Dwight Trueblood of NOAA and by Professor I. Glumov, Dr. Pilipchuk and Dr. Stoyanov of the Geology Committee and by the Yuzhmorgeologiya scientific and production association in the Russian Federation, the Russian-American programme of comprehensive environmental studies of the benthic interface (BIE) was developed, and is currently being conducted on board the "Yuzhmorgeologiya" research vessel in the Clarion-Clipperton Zone of the Pacific Ocean. Through coordination of efforts, they have shared the expenditures, combined their scientific experience and resources, and also attracted participation from other countries. The Metal Mining Agency of Japan has joined in these efforts and scientific exchanges are currently under way with groups from the Republic of Korea, China and western Europe.

21. The principal purpose of the programme is to model the impact of deep-water mining on the environment and to develop a procedure for monitoring the mining process on the basis of factual material on the current (background) state of the ecosystem in the region and of full-scale simulations of deep-water mining.

22. The company Sound Ocean Systems Inc. (SOSI) is participating in this international project by designing, constructing, testing and operating the "Benthic Disturber" system, which simulates the operation unit for collecting ferromanganese nodules by creating large clouds of suspended bottom sediments at a depth of 5,000 m. The SOSI team includes engineers from Sumiko Consultants, Co., Tokyo, Japan and Williamson Associates, Seattle, United States of America.

Basic methods used

23. Disturbance of the surface layer of the bottom deposits is generated by the Benthic Disturber (built in the United States of America), which simulates the process of deep-sea mining of ferromanganese deposits and consists of a towed equipment platform, pumps, pipes with dispersers and a buoyancy unit.

24. The structure and morphology of the bottom before and after mechanical action on the bottom along the same profile are studied using the following geophysical methods: geo-acoustic (MAK-1) and photographic/television (MIR-1) profiling.

25. Study of the consequences of the impact of mining on the site of the benthic interface is carried out by installing long-term buoyed bottom stations equipped with sediment traps, current meters and turbidity meters, and also by Neil Brown and Sea Tech hydroprobes.

26. The equipment was required to cover a large area of the seabed with sediments removed and redeposited in layers of varying thickness, so as to include the levels expected to occur in the utilization of various mining systems. To achieve this, a work plan was developed for disturbance of sediments which required the "Benthic Disturber" to be towed several times over previously designated limited profiles. As the device is towed over the profile, local currents will carry away the suspended material before it falls against the seabed. The thickness of the layer of redeposited sediments will be greater close to the impact zone, and then gradually decrease with increasing distance from the centre of the profile.

/...

Main experimental results in 1993

27. A representative site was selected at coordinates 12° 56' E and 127° 36' W in the eastern equatorial part of the Pacific Ocean. In the centre of this test site, a very narrow impact zone was established at depths close to 5,000 m. This zone was 150 m wide and 3,000 m long, running from northeast to southwest in line with the prevailing winds.

28. The Central Marine Geological and Geophysical Expedition from the Russian Federation provided the "Yuzhmorgeologiya" research vessel with a crew, a scientific team, research systems and navigation equipment. The expedition conducted a cruise to study the basic profile, set out a network of long-baseline acoustic transponders, conducted a side-scan sonar survey and installed the current meters. After a month, the current meters were removed and sediment samples were taken using box corers for analysis of the micro-fauna and macro-fauna communities. The specimens were used for comparison with specimens collected earlier and later. Eighteen sediment traps were positioned, along with two current meters to plot the sediment cloud raised by the operation of the disturber.

29. After a series of tests in dock and at sea, SOSI mobilized the disturber system with the cooperation of the captain and crew of the "Yuzhmorgeologiya" research vessel. In the course of 20 days' work in the sector, a total of 49 towing runs was conducted at depths of about 5,000 metres. For quality control of the operation of the equipment, a small-screen television system was used in quasi-real-time mode. The video system was also used for looking ahead as the disturber moved along and for observing the traces left by previous towing runs.

30. The current meter observations at the bottom stations provided for the first time a considerable body of initial data on bottom currents which made it possible to establish the current field, the nature of specific variations in the current field, the spatial variability and the processes of transfer of water masses into the bottom layer.

31. The hydrochemical studies of biogenic elements and the geochemical determination of heavy metals that were conducted made it possible to establish background levels of these substances in the bottom water layer and in the interstitial water of the bottom sediments. These data are extremely important for subsequent interpretation of the life-sustaining conditions for the benthic community prior to operation of the simulation system (the disturber) and after conducting the simulation of the mining process.

32. The data on sedimentation processes obtained using the disturber, the sedimentation traps and the turbidity meter were the most important objective of the experiment.

33. Through comparison of the amounts of suspended material lifted into the bottom layer of water by the disturber and deposited in the traps, as well as the results of X-rays of bottom sediments columns before and after disturbance, proof was obtained that the bulk of the suspended matter is fairly rapidly removed from the disturbance zone. Nodules are covered with only a few millimetres of redeposited sedimentary material.

/...

34. The BIE experiment is currently continuing.

III. DISCHARGE OF TRAINING OBLIGATIONS

35. It was planned that three trainees selected by the General Committee on the recommendation of the Training Panel would undergo training in the Russian Federation.

36. Mr. Munyao (Kenya) should have arrived for training on 1 October 1993. However, no confirmation of his consent to participate in the training was received from him in response to the notifications of the dates and conditions of the training sent to him from the Russian Federation. Since the deadline for the commencement of training for the selected participants was past, the Russian Federation did not consider it possible to postpone the dates of the training for the other candidates, who had arrived at the time specified, and considers that its obligations with respect to the training of Mr. Munyao have been discharged. The Preparatory Commission has been notified to this effect.

37. Mr. Samir Mutwalli (Saudi Arabia) arrived in the Russian Federation in October 1993 and began his training in marine geoecology at the International Scientific Instruction Centre of the Yuzhmorgeologiya scientific and production association of the Committee of the Russian Federation on Geology and Use of Mineral Resources (ROSKOMNEDRA), the address of which is Ul. Krasnogvardeiskaya 79, Gelendzhik 353470, Krasnodar District, Russian Federation.

38. The basic course of study included theoretical lectures and practical assignments in the following scientific and production disciplines:

- Spoken Russian;
- Practical marine geology: introduction;
- Principles of organization of geoecological monitoring;
- Methods of marine and laboratory geoecological studies;
- Modern sedimentogenesis and its role in the state of ecosystems;
- Hydrodynamic, hydrophysical and hydrochemical parameters of ocean water masses;
- Equipment for marine and laboratory geoecological studies;
- Natural and technology-derived factors influencing the state of geoecosystems;
- Full-scale experiments to assess the environmental consequences of industrial processing of seabed resources.

39. As a supplement to the study programme Mr. Mutwalli was given a briefing on aspects of the technology used by the Yuzhmorgeologiya scientific and production association State enterprise in the following fields of geological prospecting activity:

- Planning of marine geological prospecting work;
- Geological and economic assessment of ferromanganese nodule deposits.

40. On completion of the theoretical course of study the Special Commission established, on the basis of an interview with Mr. Mutwalli, that he had fully mastered the scientific and theoretical disciplines in which he was instructed during the training course and was able to work independently in the field of specialization selected by him, "Marine geoecology".

41. In June-July 1994 Mr. Mutwalli participated in an expedition on board the "Yuzhmorgeologiya" research vessel in the Pacific Ocean under the joint Russian-United States "Benthic Impact Experiment" (BIE), for the purpose of carrying out the practical phase of the training.

42. On the basis of the results of the interview, Mr. Samir Mutwalli was awarded a special Certificate of the Russian Federation certifying successful completion of the training process, and the relevant report on the completion of the theoretical and practical training courses was drawn up.

43. Mr. Samir Mutwalli has thus completed a full course of training under the Preparatory Commission's programme, has demonstrated his high professional abilities, and is recommended for employment in the International Seabed Authority.

44. Mr. Juan Lorenzo Díaz Naveas (Chile) arrived in the Russian Federation in October 1993 and began his training in marine geophysics at the International Scientific Instruction Centre of the Yuzhmorgeologiya scientific and production association of ROSKOMNEDRA.

45. The basic course of study included theoretical lectures and practical assignments in the following scientific and production disciplines:

- Russian language;
- Practical marine geology: introduction;
- Theoretical foundations of methods of marine geophysics;
- Geophysical equipment for marine geological prospecting work;
- Technical equipment for geophysical methods of prospecting the oceans;
- Processing and interpretation of geophysical information.

46. As a supplement to the study programme Mr. Díaz Naveas was given a briefing on aspects of the technology used by the Yuzhmorgeologiya scientific and

/...

production association State enterprise in the following fields of geological prospecting activity:

- Planning of marine geological prospecting work;

- Geological and economic assessment of ferromanganese nodule deposits.

47. On completion of the theoretical course of study the Special Commission established, on the basis of an interview with Mr. Díaz Naveas, that he had fully mastered the scientific and theoretical disciplines in which he was instructed during the training course and was able to work independently in the field of specialization selected by him, "Marine geophysics".

48. In June 1994 Mr. Juan Díaz Naveas participated in an expedition on board the "Gelendzhik" research vessel in the Mediterranean Sea under the TREDMAR International Programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO) for the purpose of carrying out the practical phase of the training.

49. On the basis of the results of the interview, Mr. Juan Díaz Naveas (Chile) was awarded a special Certificate of the Russian Federation certifying successful completion of the training process, and the relevant report on the completion of the theoretical training courses was drawn up.

50. Mr. Juan Díaz Naveas has thus completed a full course of training under the Preparatory Commission's programme, has demonstrated his high professional abilities, and is recommended for employment in the International Seabed Authority.

51. During the theoretical training Mr. Samir Mutwalli and Mr. Juan Díaz Naveas visited Moscow, where they were interviewed about the results of their training in the Department of Continental Shelf and Sea/Ocean Mineral Resources of ROSKOMNEDRA. During the interview they were informed about the activities of ROSKOMNEDRA in the field of marine research.

52. While in Moscow, Mr. Samir Mutwalli and Mr. Juan Díaz Naveas also visited the M. V. Lomonosov Moscow State University (MGU), where they were informed about the activity of the faculties in the field of ocean studies and visited an exhibition at the geological museum.

53. The lectures were given and the practical studies conducted by highly qualified experts from the Yuzhmorgeologiya scientific and production association. The trainees studied a number of theoretical disciplines in marine geology in a presentation by specially invited leading scientists of the Russian Federation from MGU and the P. P. Shirshov Institute of Oceanology of the Russian Academy of Sciences.

/...

IV. CORRELATION OF GEOLOGICAL AND GEOPHYSICAL INFORMATION

54. With a view to organizing the work of prospecting for ferromanganese nodules, work has been conducted on the analysis and correlation of the geological and geophysical information obtained in the Russian area in previous years, for the purpose of assessing the appropriateness of the procedures used in earlier phases and making future adjustments in the work in the sector, which is representative in terms of ore abundance and mining and geological conditions; the ferromanganese nodule resources and reserves have been calculated, a data bank on the geological and geophysical materials obtained by Yuzhmorgeologiya expeditions has been established in accordance with the phased approach of the work, a catalogue of the rock material from the geological work conducted by the association on ferromanganese nodules has been assembled, accompanied by the establishment of a computerized data bank, and materials on the obligations of pioneer investors have been prepared.

55. As a result of comparison of the bathymetric charts compiled on the basis of the data from the geological and geophysical studies carried out at various stages of the geological prospecting work, it has been demonstrated that the general relief characteristics identified at the survey and assessment stage of the geological prospecting work are fairly reliably established. From geo-acoustic profiling data, seven ore bodies have been mapped in the first block, ranging in width from 175 to 3,650 metres.

56. In the course of analysing the materials obtained, a database has been compiled, in accordance with the international format, which includes a number of catalogues, such as the catalogue of geological stations, geoacoustic profiles, photographic profiling work and hydrological and ecological stations. The geological and geochemical data file contains information on 45 cruises, and the seismoacoustic data file on 36 cruises or 159,500 km, 19,600 km of geoacoustic profiles, and 4,500 km of photoprofiles.

57. A computerized data bank of all the rock material from the expedition work in the seas and oceans has been compiled on an IBM PC/AT. The rock catalogue includes data from 47 cruises in the seas and oceans, and 89 per cent of the samples in it represent the Clarion-Clipperton Zone, which has been most fully studied.

Bottom sediments

58. Two fundamentally different categories of deposits have been distinguished: (i) relict deposits (nanofossil limestones, radiolarites, zeolitic clays and transitional varieties) and (ii) modern carbonaceous (calcareous muds, foraminiferous sands) and non-calcareous silico-argillaceous muds.

59. It has been established that the outcropping of relict deposits to the surface is controlled by structural and morphological characteristics and by the bottom hydrodynamic regime, is local in nature and occurs on steep slopes (more than 6 degrees) and on the bottoms and sides of valley-like depressions. The age of these deposits has been determined as early Miocene. They occur most frequently in the north-western and eastern parts of the area.

60. The variability of the modern non-calcareous silico-argillaceous muds is determined by the morphology of the underlying older deposits, the intensity of erosion and accumulation processes, the hydrodynamic situation in the bottom layer of water and the nature and intensity of modern biogenic productivity. The age of the muds is dated as pleistocene.

Ferromanganese formations

61. Three genetic types of ferromanganese nodules have been identified: diagenetic, hydrogenous and hydrogenous-diagenetic (genotypes C, A, B). It has been established that each genotype is formed in strictly defined geological and geochemical conditions and possesses a set of formal characteristics by means of which it can be identified (shape, content of the main chemical elements - nickel, manganese, copper; nodule texture). Histograms of the distribution of sizes of fractions of ferromanganese nodules of genotypes A and B, genotype C and crusts have been constructed. The frequency of occurrence of mineral associations of the various genetic types, determined on the basis of averaged samples, has been calculated, and the comparative elemental composition of nodules of genotypes A, C and B for various sectors of the north-eastern area and of nodules of genotypes A, B and C in an area with a varying density of ferromanganese nodule deposits has been determined. Histograms of the distribution of the main chemical elements in ferromanganese nodules for the various nodule genotypes have been constructed.

62. Distribution of the genotypes is controlled by a number of factors, most important among which are the lithological factor, the geomorphological factor and the hydrodynamic factor.

63. The main result of the work may be taken to be the establishment of the fact that accumulations of ores which are of industrial interest are generally formed by diagenetic nodules, which occupy about 70 per cent of the total surface of the area.

64. To investigate the distribution of bottom sediment overburden on the ore accumulations in the area, figures for the overburden coefficient were calculated by station. Information from 414 geological stations was used, resulting in the identification of areas of intensive overburden of the ore accumulations with Ko=0.6-1.0, moderate overburden with Ko=0.3-0.6 and areas where overburden is completely absent.

Mining and geological conditions

65. Zoning of the area in the light of data on bottom gradients has been carried out. Maps have been prepared showing areas of distribution of carbonaceous deposits and outcroppings of basalt on the bottom surface, which are the main obstacle to the collection unit, and volcanic structures and slopes of more than 6 degrees have been separately identified. Deep depressions (from 5,100 m to 5,300 m deep) in which sediments with a low carrying capacity are distributed have been mapped.

66. Thus an analysis and correlation of the geological and geophysical data on the area of the seabed in the Clarion-Clipperton Zone of the Pacific Ocean has

/...

been carried out, involving the compilation of databases on all types of activities and of a set of materials on the geological structure of the ore zone, and the need to continue geological prospecting work has been substantiated.

/...

best copy available

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.44
3 August 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
New York, 1-12 August 1994

RELINQUISHMENT OF PIONEER AREAS

(RESOLUTION II, PARAGRAPH 1 (e))

(Submitted by the delegation of India)

1. Pursuant to resolution II of the Third United Nations Conference on the Law of the Sea governing preparatory investment in pioneer activities relating to polymetallic nodules, the Statement on the implementation of resolution II of 5 September 1986 (LOS/PCN/L.41/Rev.1, annex) and the Statement of Understanding on the implementation of resolution II of 10 April 1987 (LOS/PCN/L.43/Rev.1), and pursuant to the decision of the Preparatory Commission (LOS/PCN/94 and Corr.1) to register the Government of India as a pioneer investor, adopted by its General Committee on 17 August 1987 in accordance with the rules of procedure of the Preparatory Commission, the Department of Ocean Development, Government of India, has been allotted a pioneer area of 150,000 square kilometres in the Central Indian Ocean Basin. The pioneer area is bounded by the lines joining the turning points, the geographical coordinates of which are specified in the Certificate of Registration given by the Secretary-General of the United Nations at United Nations Headquarters on 18 December 1987.

2. The Understanding on the Fulfilment of Obligations by the Registered Pioneer Investors and their Certifying States was unanimously adopted by the General Committee on behalf of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea on 30 August 1990 (LOS/PCN/L.87, annex).

/...

3. Pursuant to the aforementioned decisions and in accordance with the provisions on relinquishment in resolution II, paragraph 1 (e), the delegation of India has the honour to hereby notify on behalf of the Government of the Republic of India that 20 per cent of the pioneer area (30,000 square kilometres) is being relinquished. The area relinquished shall be that bounded by the lines joining the turning points and the geographical coordinates indicated in the schedule hereto annexed.

/...

Annex

SCHEDULE

List of coordinates

Turning point	Latitude (° S)	Longitude (° E)	Turning point	Latitude (° S)	Longitude (° E)
R1	10.750	73.000	R31	12.667	76.417
R2	10.750	74.000	R32	12.667	76.167
R3	11.000	74.000	R25	12.417	76.167
R4	11.000	73.750			
R5	11.750	73.750	R33	12.750	76.000
R6	11.750	72.750	R34	12.750	76.250
R7	11.250	72.750	R35	13.000	76.250
R8	11.250	73.000	R36	13.000	76.167
R1	10.750	73.000	R37	13.250	76.167
			R38	13.250	75.667
R9	14.000	73.000	R39	13.000	75.667
R10	14.000	73.250	R40	13.000	75.750
R11	14.250	73.250	R41	12.833	75.750
R12	14.250	73.000	R42	12.833	75.783
R9	14.000	73.000	R43	13.000	75.783
			R44	13.000	76.000
R13	15.250	75.000	R33	12.750	76.000
R14	15.250	75.250			
R15	15.500	75.250	R45	11.250	78.850
R16	15.500	75.500	R46	11.250	79.000
R17	16.250	75.500	R47	14.000	79.000
R18	16.250	75.250	R48	14.000	78.750
R19	15.750	75.250	R49	14.500	78.750
R20	15.750	75.000	R50	14.500	78.250
R13	15.250	75.000	R51	14.000	78.250
			R52	14.000	78.500
R21	12.500	75.750	R53	13.750	78.500
R22	12.500	75.833	R54	13.750	78.750
R23	12.750	75.833	R55	12.250	78.750
R24	12.750	75.750	R56	12.250	78.850
R21	12.500	75.750	R45	11.250	78.850
R25	12.417	76.167	R45	11.250	78.850
R26	12.417	76.250			
R27	12.333	76.250			
R28	12.333	76.367			
R29	12.500	76.367			
R30	12.500	76.417			

/...

UNITED NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.45
4 August 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA
New York, 1-12 August 1994

RELINQUISHMENT OF PIONEER AREAS

(RESOLUTION II, PARAGRAPH 1 (e))

(Submitted by the delegation of Poland on behalf of the Interoceanmetal Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech Republic, the Republic of Poland, the Russian Federation and the Slovak Republic)

1. Pursuant to the decision of the General Committee of the Preparatory Commission for the International Seabed Authority and the International Tribunal for the Law of the Sea of 21 August 1991 on the application submitted by the Governments of the Republic of Bulgaria, the Republic of Cuba, the Czech and Slovak Federal Republic, 1/ the Republic of Poland and the Russian Federation, for registration of the Interoceanmetal Joint Organization (IOM) as a pioneer investor under resolution II of the Third United Nations Conference on the Law of the Sea (LOS/PCN/122), an area B of 150,000 square kilometres was allocated as a pioneer area for further research and development work.

2. In accordance with the schedule established in paragraph 1 (e) (i) of the above-mentioned resolution II, IOM relinquishes 20 per cent of the pioneer area which includes sectors B_{2a} of 3,789 square kilometres and B_3 of 26,883 square kilometres. The total area of those sectors, which are situated in the southern part of the pioneer area and adjoin the sector reserved for the International Seabed Authority (see annex I) is 30,672 square kilometres or 20.45 per cent of the area of the pioneer area. A list of coordinates is annexed hereto (annex II).

/...

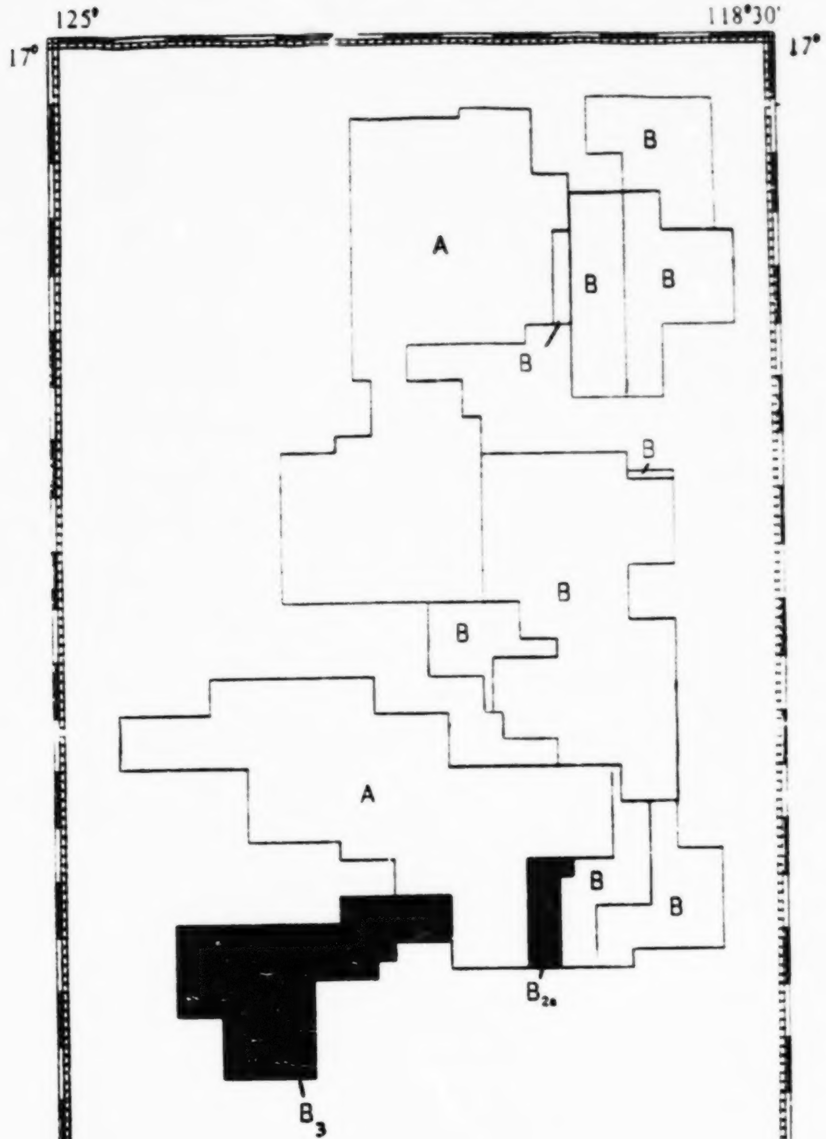
Notes

1/ On 25 November 1992, the Federal Assembly of the Czech and Slovak Federal Republic adopted Constitutional Law No. 542, which terminated the existence of the Czech and Slovak Federal Republic; the Law came into force on 31 December 1992. The legal successors to the Czech and Slovak Federal Republic are two sovereign States: the Czech Republic and Slovakia. The Czech Republic and Slovakia were both admitted to membership in the United Nations on 19 January 1993.

/...

Annex I

Disposition of relinquished sectors B_3 and B_{2a}



A	**- sector reserved to the International Seabed Authority**
B	**- sector allocated to IOM**
B_3, B_{2a}	**- relinquished sectors**

/...

Annex II

LIST OF COORDINATES

Sector B_1	North Latitude	East Longitude
1.	7°40.000'	123°35.000'
2.	8°15.000'	123°35.000'
3.	8°15.000'	124°00.000'
4.	9°05.000'	124°00.000'
5.	9°05.000'	122°30.000'
6.	9°20.000'	122°30.000'
7.	9°20.000'	121°30.000'
8.	8°55.000'	121°30.000'
9.	8°55.000'	122°00.000'
10.	8°45.000'	122°00.000'
11.	8°45.000'	122°10.000'
12.	8°35.000'	122°10.000'
13.	8°35.000'	122°45.000'
14.	7°40.000'	122°45.000'
1.	7°40.000'	123°35.000'

Sector B_2.	North Latitude	East Longitude
1.	8°40.000'	120°47.440'
2.	9°40.000'	120°47.440'
3.	9°40.000'	120°22.410'
4.	9°30.000'	120°22.410'
5.	9°30.000'	120°30.000'
6.	8°40.000'	120°30.000'
1.	8°40.000'	120°47.440'

/...

UNITED
NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.46
3 August 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL TRIBUNAL
FOR THE LAW OF THE SEA
New York, 1-12 August 1994

LETTER DATED 22 JULY 1994 FROM THE DIRECTOR GENERAL OF THE INTEROCEANMETAL JOINT ORGANIZATION (IOM), ON BEHALF OF THE INTERGOVERNMENTAL COUNCIL OF IOM, ADDRESSED TO THE CHAIRMAN OF THE PREPARATORY COMMISSION

Pursuant to paragraph 8 of the Understanding on the fulfilment of obligations by the registered pioneer investor the Interoceanmental Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech Republic, the Republic of Poland, the Russian Federation and the Slovak Republic (LOS/PCN/L.108, annex) I have the honour hereby to submit on behalf of the Intergovernmental Council of IOM, on the basis of the available data collected by IOM in the area reserved for the Authority, the document referred to as "Preliminary report on the reserved area for the Preparatory Commission".*

(Signed) Ryszard KOTLINSKI
Director General of the
Interoceanmental Joint
Organization (IOM)

---

* The report has been transmitted to the Secretary-General.

/...

UNITED NATIONS

LOS

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Distr.
RESTRICTED

LOS/PCN/BUR/R.49
31 August 1994

ORIGINAL: ENGLISH

PREPARATORY COMMISSION FOR THE
INTERNATIONAL SEABED AUTHORITY
AND FOR THE INTERNATIONAL
TRIBUNAL FOR THE LAW OF THE SEA

Summary of the preliminary report on the reserved area for the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea*

(Prepared by the Interoceanmetal Joint Organization and submitted by the delegation of Poland on behalf of IOM's certifying States)

1. In accordance with paragraph 8 of the understanding on the fulfilment of obligations by the registered pioneer investor, the Interoceanmetal Joint Organization (IOM) and its certifying States, the Republic of Bulgaria, the Republic of Cuba, the Czech Republic, the Republic of Poland, the Russian Federation and the Slovak Republic (LOS/PCN/L.108, annex), and on the basis of the available data collected in the area reserved for the Authority, IOM prepared the report on the work performed. A summary of that report is contained in paragraphs 2 to 7 below.

2. The report is divided into three chapters. Chapter 1 describes the brief survey of the equipment and methods by means of which the initial data have been gathered. Chapter 2 presents the total volume of geological and geophysical work undertaken within the reserved area. Chapter 3 describes the geological characteristics of the reserved area.

3. The report is based on the analysis of the statistical distribution of the metal content values. The report also contains 13 maps at a scale of 1:500,000 and a floppy disk with the catalogue of data from sample stations (562 stations).

---

* Supplement to LOS/PCN/BUR/R.46.

/...

4. The area reserved for the Authority consists of two sectors, namely A1 and A2. Analysis of the available data shows that the reserved area is part of the richest section in the Clarion-Clipperton ore field and is prospective to mining of polymetallic nodules. The potential for commercial exploitation of polymetallic nodule fields in the area investigated is provided by the extensiveness of the ore fields and the high content of main metals.

5. The value of grade exceeded 2.5 per cent, conventional nickel concentration exceeded 5 per cent and the value of average abundance exceeded 6.63 kg/m^2; these are reliable parameters for an assessment of prospects for commercial exploitation.

6. The prospects for commercial exploitation of ore deposits will depend on the spatial distribution of nodules, including their abundance and metal content, on mining conditions, and on further investigation. The prospecting stage of the investigation will provide a study of the geological structure, mechanical properties of bottom sediment and nodules, small-scale variability of nodule abundance and metal content, and an estimation of resources.

7. At this time, one can state that the area investigated has economical and potential commercial reserves.

-- --